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2015



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NEW!
2015

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2015

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2015

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3/8" crowfoot, oxygen sensor - 20mm	£3.84	£4.61
3/8" oxygen sensor socket - 8mm	£3.66	£4.39
3/8" oxygen sensor socket - 22mm	£3.66	£4.39
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2015

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Welcome



Kit car journalist for over 14 years. Built a Sylva Riot and raced a Tiger Avon for several seasons. Has run numerous kit cars as daily drivers over the years.

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It was a remark by Alisdair Suttie in this issue's Race Diaries that first got me thinking. He said of the digital instruments he is going to fit to his Sylva Leader are "not in keeping with [its] 1986 build date." No matter – the additional accuracy, not to mention the tidier look, of the newer parts were compensation enough for taking the car away from originality.

Those thoughts were compounded by some work Rob Davenhall has done on one of his Midtec Spyders in his most recent Running Reports update. Both pertain to updating kit cars beyond the era they were created. Coincidentally, both owners were speaking of swapping out their analogue gauges in favour of digital read-outs. They were talking instrumentation but, of course, there are many ways in which an older kit car can be updated... alloy wheels, metallic paint, aeroscreens, diffusers, LED lighting. The list could go on.

It made me wonder whether there is an argument for keeping kit cars 'original' – which is a rather notional concept anyway, given that there's no such thing as a standard specification anyway.

Part of the joy of kit car ownership versus, say, classic car ownership is a freedom from the shackles of originality. My father built a Tiger Super Six in 1992 (which was when I first found out what a kit car is) and still owns it today. It's now on its second engine, third set of wheels, second dashboard, second pair of seats, has had the windscreen and weather gear deleted and has had numerous other developments over the years. The result? It now looks better than ever – and has kept pace with kit car trends.

However, I will admit to some nostalgia when, a couple of years ago, I spotted a Super Six at the Stoneleigh show that looked exactly as his did in 1992: same leather trimmed dashboard, old-school alloys, basic seats and full screen. I doubt there will ever be a market for 'original' spec kit cars, though, and people will continue to put DigiDashes in their 1980s kit cars with impunity. And why not?

Talking of Running Reports, as I was a few paragraphs ago, it's good to see James Shipperley's completed DDR Miami in these pages. He has made startling progress, which is extra remarkable given that he chose such an ambitious project for his first kit car build.

What's more, as well as making a USA spec kit car meet UK regulations, his Miami is also the very first customer built example anywhere to have been completed. Not that it's quite finished yet. Unusually, he is due to make a return to Running Reports once he has retrimmed the interior, a job that he has lined up for the winter.

Quite understandably, though, he wanted to make some use of the car in the summer before he embarked upon removing the whole of the inside of the car. We also made the most of the chance to grab the full feature of the car, which is why it comes slightly out of sequence with his final appearance in Running Reports, which will be early in the new year.

Adam Wilkins, Editor

 @AdamWilkins_



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From BRM to AMG: Banshee to remain a one-off?

The Banshee, built by the Australian father-and-son team of Chris and Michael Bailey, had originally been tipped for production by their own BRM Sportscars organisation. That all changed, though, when son Michael moved to Germany and promptly got a job with Mercedes-AMG's race R&D development – a position he gained thanks in no small part to having the Banshee on his CV.

Development of the Banshee started in 2006, the vision being to create the most technically innovative sports car possible for low-volume production.

It has a monocoque construction of composite of kevlar, carbon fibre and GRP, with collapsible steel box sections front and rear. It has double wishbones and bespoke uprights and hubs all-round, running 17in wheels front and rear, which gives you an idea of the scale of the car. But it's the engine package that creates the most technical intrigue.

There are two mid-mounted 1340cc Suzuki Hayabusa engines driving through their own



6-speed sequential gearboxes and a common differential. The 11,000rpm redline, and combined output of 402bhp is how the car got its Banshee name. BRM, incidentally, stands

for Black Road Motorworks and is not to be confused with the historical British Racing Motors grand prix team.

Low weight was always one of the key principles of the Banshee,

the target being 800kg. It was to be a car that would inspire owners to take part in track days and motorsport events, yet still be capable of driving on the street. Both wanted the car to be

V-Storm makes a comeback

The V-Storm, previously made by SDR Sportscars, is tipped to make a comeback to the market at next year's Stoneleigh show.

Dan Carpenter, who has been building his own high-spec V-Storm (not shown here) over the last few years, has bought the rights to the car and will



market it under the DJC Kit Cars banner. It will fit into his existing precision engineering business.

The deal included all the IP rights, body moulds and some jigs, but the main chassis jig needs to be remade (possibly from Dan's own chassis, which would require a strip-down of his car).

The car will retain the Subaru Impreza power that the car is well known for. Different rear subframes will be offered to suit alternative engine options.

The V-Storm was originally available with Aprilia V-twin power, and a bike engine option may become available – but with a more conventional engine, such as a Yamaha R1. There may also be a more affordable Ford Zetec option.

That's all to come in the future, though. For now the good news is this: a very capable kit car – indeed our Car of the Year 2010 – is back in production. www.djckitcars.co.uk

FACT

The Banshee is so called because of the noise made by its twin Suzuki Hayabusa engines.



one that owners would cherish and keep as a collector's item while still being stunning to drive in terms of performance and handling. Backing up the car's road car credentials is the fact

that the hard-top is removable.

While the plan had been for Michael to oversee productionisation of the Banshee, his role at AMG prevents that. As such, Chris

is looking to either sell the car as a one-off, or to find another organisation to put it into production. He can be contacted on the email address below.

E: baileyfam@primus.com.au

Caterham's Superlight reprise

Just when we got used to the fact that Caterham had abandoned its Roadsport, Supersport and Superlight range hierarchy in favour of a number-based naming system, it has released the Superlight Twenty. Only 20 will be made, though.

The limited edition model has been created in celebration of the original 1996 Superlight, a model whose production ceased, in its original guise, in 2004.

The special edition car is by no means the fastest to carry the Superlight name – its 135bhp 1.6-litre Ford Sigma engine is good for a 122mph top speed and a 0-60mph sprint of 4.9sec.

Speaking of the new car, CEO Graham Macdonald said: "It's not an exact replica of the

original but it's most definitely cut from the same cloth and we know customers will love it for all the same reasons."

The Superlight Twenty is available only with a S3 chassis and is minimal in its spec.

There's lots of carbon fibre in the bodywork, a titanium coloured chassis and carbon sports seats that are otherwise exclusive to the flagship 620R. It's £26,995 in kit form or £3000 more built. www.caterham.co.uk



Marlin price correction

In our road and track test of the Marlin Sportster in the last issue, we ran a price for a self-built car that was rather too high – to build a BMW M3 powered car at home to the same standard as the demonstrator would actually cost around £12,500 plus donor. Meanwhile, a non-M Power can be built from around £10,000 all-in, as we stated. W: www.marlinsportscars.co.uk



Widow SPR1 ready for launch

The final throes of the development of the SPR1, the Mazda MX-5 based body conversion from Widow Sports Cars, have been played out publicly, with plenty of updates and communication with potential customers. Here's a first glance of the car in its production form, and we'll bring you more detailed information when the car is ready for test drives.

W: www.widowsportscars.co.uk



Stylus out of the mould

Stylus Sports Cars made its debut at the Stoneleigh show this year, having taken over the manufacture of the ex-Sylva model of the same name. Previously owned by Specialist Sports Cars, the project had been dormant for some time. While the company has been busily working on existing cars, the photo below shows the very first customer body to be taken out of the mould since it took on the tooling. It's actually the first Stylus body to have been produced since 2007!

W: www.ssc-stylus.co.uk





Interest waning?

Anyone who suggests that interest in kit cars is in decline would do well to look at the Ultima Facebook page. The company may produce around 12 turnkey cars each year, but by far the majority of the cars it manufactures are in component form, for home assembly.

Ultima is a relative newcomer to the world of social media, although it has always extolled the virtues of the internet. So it's fascinating to see that the company has a frankly insane 73,000 followers on Facebook. That is an extraordinary number of people who are interested in the company and want to interact with it. But even this figure pales into insignificance compared with the release of the company's new promo video for the new Evolution. Within two weeks of being uploaded it has been viewed 108,000 times!

Let's be clear, the Ultima Evolution is a kit car, with most customers assembling it at home. The company has been extremely shrewd in generating phenomenal interest in its products by way of its various speed world records and, of course, the way it looks. And the new 1020bhp engine installation looks set to build on that excitement.

But at the core of this is a product that interests and excites people, produced by a successful kit car manufacturer which is making a great product. Clearly, not all kit cars need to be supercars which cost tens of thousands to create, but if the Ultima scenario proves anything, it is that people remain interested in kit cars, if the kit cars remain interesting. That's great news for all of us who work within the scene.

Ian Stent

ian@performancepublishing.co.uk

Allen Grant calls in at Hawk

Does any Cobra replica manufacturer have stronger links to the original cars than Hawk Cars? Here's boss Gerry Hawkrige chatting with Allen Grant, who popped into the company's East Sussex workshop recently.

Grant raced an original Shelby Daytona Coupé (chassis number CSX2300) and prepared the cars for the 1965 season.

While chatting Daytonas, Grant



also signed Hawk's Daytona replica that's under development.

www.hawkcars.co.uk



Peel Viking makes a comeback

There was a time when the ubiquitous and rust-prone Mini was the donor car answer to many kit car builders' problems. Some Mini based cars went on to become very well known, but one which is slightly forgotten is the Peel Viking, made by the same Isle of Man based company that built the P50, as made famous by its appearance on *Top Gear*.



Around 25 were made in period, a tally that will be added to now



From the ads: GTM Libra



The best GTM Libra we ever drove was powered by a Honda K20 VTEC engine. It was right at the end of the model's life, and the stratospheric engine suited it perfectly.

This car, which is currently advertised in a few places online, has a similar Honda B18c engine, and according to the advert was originally factory built in 2005 to be exported to Japan. In the event, it stayed in the UK where it has now had two owners. They've used it sparingly; despite the advert's (correct) assertion that the Libra is suitable for daily use, this example has covered just 3400 miles.

Performance will be more than a little brisk. To give it some perspective, its 250bhp per tonne is slightly better than that of a Lotus Exige S1. It now has 11 months MoT and a fresh cambelt. The asking price is £14,995, and if it's still available you'll find it listed on eBay and Car and Classic.

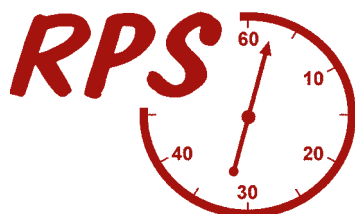


that Exo Sports Cars has bought the tooling to put the car back into production. The company bought the tooling from a microcar enthusiast who had intended to put the car back into production himself, but instead had stored the moulds. The two images here are of an original Viking, but the one above is the first of the newly produced monocoque shells.

The plan is to offer the Viking in conventional kit form (around £3995, to be confirmed) as well as a drive-in-drive-out build service for those providing their own donor cars. Finally, the company will also offer turnkey cars built with all new parts supplied by Mini Sport.

www.exosportscars.co.uk

T: 07900 431244
E: enquiries@rps-ltd.info
www.rps-ltd.info



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The specialists from the Frankfurt Motor Show



There wasn't much to interest fans of specialist cars at the recent Frankfurt Motor Show, according to CKC scribe Gary Axon who took these photos during his visit.

These three did pique his interest though – and they share one common theme: electric power. The car pictured above has the rather complicated name Power Plaza Yebujana R, which seems unnecessarily difficult to remember. It's a compact electric roadster and is tipped for limited production late next year.

Below left is a car that could have been an entry for our Top 10 Wooden Kit Cars

feature last month – apart from the fact it isn't actually a kit car. Instead, it's called the Julia and is the work of Peter Szabo. At Frankfurt, it was used to promote mobile phones. Perhaps the fact that it's electric (and solar!) powered gives it a link to the products it was used to push.

Finally, and perhaps most familiar in form at least to kit car fans, is the Turn-E, an electric Porsche 356 Speedster replica. Again, this was tied in to products other than cars, having been constructed by a company that specialises in solar-powered houses, hotels and electric charging car ports.



Project for sale: AB Sabre G2

Andy Bates, MD of AB Performance, has decided to sell areas of his business in order to have more family time.

One project that is definitely for sale is the Sabre G2 racing car. The Generation 2, was the thoroughly revised version of the original Sabre, which benefitted from the investment by Peter Jones from the BBC's *Dragons' Den* show.

The revisions included a much more 'production' approach to the car, as opposed to the specialist car industry's propensity to create a series of one-offs that change along the way. It means that spares back-up is

easier to provide. Any buyer of the project would benefit from that programme of development. Currently, five Sabre G2s are in competition.

As well as the moulds and jigs to manufacture the car, the sale will include all rights and other intellectual property, such as the CAD files. There's also a stock of parts that will be part of the deal, including high value billet aluminium components.

The asking price for the project is around £40,000 and interested parties should contact Andy Bates directly on 01449 736633.

www.abperformance.co.uk



RV Dynamics returns to UK

Vince Wright, boss of RV Dynamics, has relocated his factory to the UK after several years in Sri Lanka. Now in Doncaster, South Yorkshire, RV Dynamics will offer parts to owners of its Python Cobra replica, but will no longer manufacture kits. In addition, Vince will also offer a kit build-up

service. RV can undertake all kinds of work, including wiring, trim, custom parts fabrication, machining, welding and GRP repairs. The first job is an engine swap – V12 to more powerful V8 – in Gavin Richardson's RV Nemesis.

T: 07495 161490.

E: vincervd@yahoo.com



100 issues ago

The first Cobra replica to appear on the cover of *Complete Kit Car* was a Dax 427, which underwent our full road test. Also covered were a couple of kit car adventures: We took an amphibious Dutton to the Henley Royal Regatta (and were promptly thrown off the river!), and we also had a story on Barrie Stimson and his son's trip to the Arctic in two buggies they'd built.





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BKCC @ Combe

The Bristol Kit Car Club had a very special day out recently. The plan was hatched last year when club organiser Colin Atwell commented that general track days were getting busier and busier, resulting in long queues and not much track-time. The result was an exclusive club track day at BKCC's local Castle Combe circuit.

Twenty-five cars from across the spectrum booked places. Also in attendance was guest racing-driver Dino Zamparelli. Dino is supporting the Go! Inspire charity that BKCC has been instrumental in forming, and he was offering seat-clenching passenger rides around the track. Club member Ed Pollit was kind enough to lend his Mac#1 for Dino to use. You can watch Dino in action by scanning the QR code here or hitting the play button in the CKC app.

A great mix of cars and drivers were in evidence, from experts to rookies, and Go! Inspire made a lot of money on the day, helping it continue to build a track-car for mobility impaired drivers.

www.goinspirenow.org

www.bristolkitcarclub.co.uk



Like buses...

How many GP Madisons have you seen recently? Having just done a feature on a spectacular example in issues 102 and 103, Colin Homewood then sent in this picture after he attended the Devon County Show and found himself parked next to another fine example of the breed which was apparently still undergoing a long-term restoration... You don't see a GP Madison and then... you get the idea!



Wedding Bells

We featured Roger Bells' terrific Pilgrim 3000 Healey replica back in issues 92/93 and he recently used the car for almost certainly its most important duty to date.

Roger recently tied the knot with girlfriend and now wife,

Monica, and his Healey lookalike was used to carry them both to the wedding in Dorchester (complete with blue ribbons to match Monica's wedding dress) and on to the reception nearby.





Zeros on the run

Here's news of another popular GBS Zero Run Out, organised by the factory for the enjoyment of its customers. The dynamism and effort put in by Great British Sports Cars is a credit to them. This was the third 'Run Out' of the year and, rather than assembling at the factory as on previous occasions, this time

cars gathered at the Grand Prix Collection at Donington Circuit. After a quick coffee and bacon buttie, it was then off for a 95-mile trip, across to Rutland Water and then on to Market Harborough for lunch at a pre-booked restaurant. What a great way to enjoy the car you've built.

www.greatbritishsportscars.co.uk

Philip Greenfield with daughter Fae map reading!



In brief

You can read our Goodwood Revival review elsewhere in this issue, but we couldn't resist including these two shots of the event in the evening (and one more of the racing!). Goodwood carries on quite late each night, with trade stands remaining open, and both Nostalgia Cars and Great British Sports Cars managed to snap these shots of their respective stands. It's certainly an event like no other.



Kent club celebrates 25 years

The Kent Kit Car Club is one of the UK's more active kit car clubs, and it wasn't about to let its 25th anniversary slip by without some celebrations.

Formed in 1990 by a small group of local owners, founder

members John Cook, Neil Foreman, John Nash and Terry Sullivan are still highly active within the organisation (see pic far right). Today the club has around 140 members, has a popular monthly gathering as well as regularly



attending shows, track days and hopping across to the Continent for longer jaunts.

The 25th anniversary event was held at club member Sam Harpa's house and over 30 cars attended, along with around 110 people. Organised games were geared at all ages, while more leisurely activity included the use of Sam's pool, wine tasting, a massive barbeque and, of course, lots of chat.

If you are a kit car owner in the Kent area, then you know where to go...

www.kentkitcarclub.com



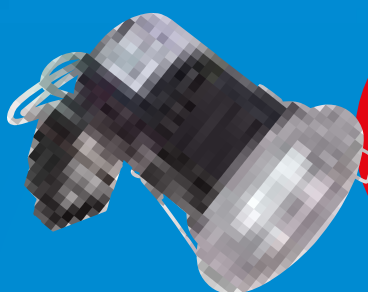
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2015/16 Events

There's plenty to entertain you and your kit car. Here's our diary of the events over the coming 12 months that have caught our eye. If you know more, tell us and we'll get the word out.



NOVEMBER

Sunday 1st

Goodwood Breakfast Club: Bahn-Stormer Sunday

Goodwood Motor Circuit, West Sussex
Satnav: PO18 0PX
T: 01243 755060
E: cooked@goodwood.com

7th/8th

The Footman James Bristol Classic Vehicle Restoration Show

Bath & West Showground,
Somerset.
Satnav: BA4 6QN
T: 01507 529529
W: www.carsandevents.com
*Established classic car event now with
dedicated hall for kit car clubs. Contact
CKC directly to register your interest.
Limited indoor space.*

Saturday 21st

totalkitcar LIVE

Brands Hatch, Kent
T: 01883 372 085
E: stevetotalkitcar@yahoo.co.uk
W: www.totalkitcar.com
Satnav: DA3 8NG

2016 Events

JANUARY

14th-17th

Performance Car Show

NEC,
Birmingham
Satnav: B40 1NT
T: 0844 581 1419
W: www.performancecarshow.com
*Part of Autosport International, the
Performance Car Show is looking
like must see viewing for the kit car
enthusiast. Come and find us as we
promote the 2016 Track Day Directory.*

MAY

1st/2nd

The National Kit Car Motor Show

Stoneleigh Park,
Warwickshire
Grosvenor Shows
Satnav: CV8 2LZ
T: 01406 372600
W: www.grosvenorshows.co.uk
*The world's biggest kit car show. Lots of
clubs, manufacturers and parts stands.
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Saturday 14th

CKC/Omex Track Day

Llandow Circuit.
Satnav: CF71 7PB
T: 01823 617908
E: ian@performancepublishing.co.uk
W: www.completekitcar.co.uk
*Join us at Llandow Circuit for a
brilliant track day, exclusively for
kit cars. Beginners welcome at this
very friendly day. Contact us to
register your interest.*

JUNE

Sunday 5th

London to Brighton Kit and Sports Car Run

Classic Motor Events
T: 01527 831726
W: www.classicmotorevents.co.uk
Join us on this great event.

16th-20th

Le Mans Tour

Classic Car Tours
T: 01355 260422
W: www.classic-car-tours.com
From £149 per person.

18th/19th

Le Mans 24-Hour

France
An annual pilgrimage for kit car owners.

JULY

7th-11th

Le Mans Classic Tour

Classic Car Tours
T: 01355 260422
W: www.classic-car-tours.com
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8th-10th

Le Mans Classic

France

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Gary Axon

"Anyone brave enough to take on the challenge of building a Charger, or indeed many of the other kit car offerings available in the 1960s and '70s, must have quickly become on first name terms with their local scrapyards owner and his dog, as they would have needed to spend a considerable amount of their waking hours there, looking for obscure and elusive parts to fit onto their kit"



In 1982 Gary Axon penned his first published words for *Alternative Cars* magazine, precipitating what has become a lifelong obsession with the more obscure elements within the automotive world. Today he's a leading light in helping to assemble the shortlist of invited cars at motoring events, such as the Goodwood Festival of Speed, Revival and the Concours of Elegance.

If Stuart Mills of MEV fame is reading this, as I'm sure he will be, this is a very public reassurance to him that he needn't worry, as I haven't forgotten that I still owe him a pint!

So why do I owe him a pint, you may ask? Well, way back in May, a modified 1970s kit car helped to form a show-stopping part of MEV's extensive display at the Stoneleigh kit car show. This ageing kit was a bright red Embeesee Charger, a Siva-derived gullwing coupé first produced by Mike Carlton in High Wycombe in the mid-1970s.

Discussing the Charger with Stuart, I casually said, "I bet you don't know what rear windscreen the car uses?" He immediately replied "Citroën!" Damn it, he got it right! In truth I should only owe him half a pint, as he only gave me half the answer, as specifically the back window is taken from a 1970s Citroën GS (the saloon version, if you want to be really pedantic).

Seeing an Embeesee Charger again after many years reminded me how much more fortunate kit car builders are today, using a single-donor vehicle as a base. As well as its Citroën GS rear screen, the Charger sourced other components from an extraordinarily wide range of vehicles, as diverse as the Ford Cortina Mk3 (windscreen), Fiat 126 (side glass), Hillman Avenger (headlamps), Bedford CF (tail lights), Ford Escort Mk2 (door handles) and so on, not to forget its VW Beetle chassis and mechanical base of course.

Anyone brave enough to take on the challenge of building a Charger, or indeed many of the other kit car offerings available in the 1960s and '70s, must have quickly become on first name terms with their local scrapyards owner and his dog, as they would have needed to spend a considerable

amount of their waking hours there, looking for obscure and elusive parts to fit onto their kit.

Through environmentally-led EU legislation, the old days of taking your life in your hands, clambering around a grubby, lubricant-strewn scrap metal yard to dismantle the brake master cylinder from a rusty Cortina, precariously balanced on the top of a high pile of wrecks, are now a very distant memory.

A recent visit to a modern vehicle dismantling and recycling centre to try and find a factory hardtop for my Smart Roadster Coupé (I'm still looking, just in case you might have one gathering dust at the back of your garage) reminded me what a far cry these eco-friendly facilities are from the oily scrapyards of my youth, where jagged metal cuts and being chased by a savage guard dog were the norm.

An old scar permanently reminds me of an injury I sustained in a scrapyards many moons ago as a spotty teenager, teetering on the rear bumper of a wrecked Triumph Vitesse, attempting to unbolt the tailgate of a scrapped Honda S800 Coupé to replace the rusty one on my own cherished example.

It was so cherished that a few months later I'm embarrassed to admit that I left my own S800 at the same scrapyards due to a catastrophically expensive MoT failure list. It pains me to think even about it now, but the Honda was worthless at the time.

As for multi-component kits, thankfully the modern single donor vehicle and current replacement body panel fad has seen an end to these intriguing but complex specialist cars, so it looks like I will be forking out for fewer pints in the future!

NEXT MONTH

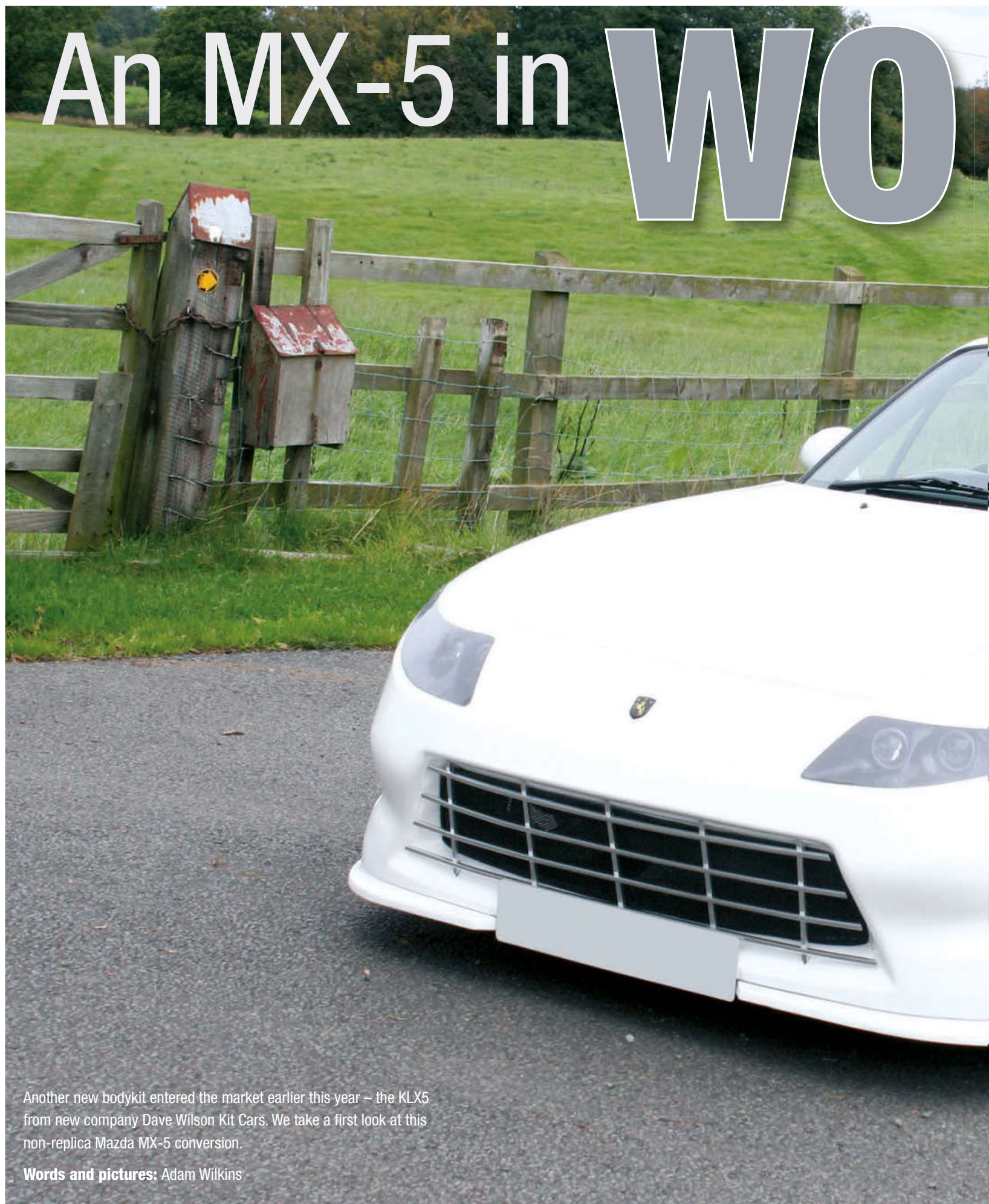


Richard Heseltine

Respected classic car journalist Richard Heseltine has been a major player at *Classic & Sports Car* and *Motor Sport* magazine before becoming a sought after freelance journalist. But he also happens to be one of the most knowledgeable kit car buffs you'll ever come across.



An MX-5 in WO



Another new bodykit entered the market earlier this year – the KLX5 from new company Dave Wilson Kit Cars. We take a first look at this non-replica Mazda MX-5 conversion.

Words and pictures: Adam Wilkins

LF'S clothing



“If I had a brand new Porsche, I’d take an angle grinder to it. I’d have to change it because I’d know that other people

have one the same.” Such is Dave Wilson’s desire to drive something different to everyone else, he wouldn’t even leave a supercar the way it came from the factory. So it’s unsurprising that, when he decided to design and develop his own body conversion kit, the newly launched Mazda MX-5 based KLX5, he avoided going down the route of replication.

That’s not to say that he has anything against replicas in principle. In fact, he has built both a Ferrari 355 and 360 replica in the past. “I got fed up with people saying they weren’t real,” he says. That was part of the motivation that led him to start developing a kit of his own, with his own styling. “It doesn’t cost a lot to have a go,” he says, “and even if it didn’t work out I could have sold the donor MX-5 in bits and got most of the money back.”

Professionally, Dave has been involved in a number of trades, mostly within the building industry. At the moment,

he’s a full-time tiler, but he has ambitions to make his eponymous company,

Dave Wilson Kit Cars, his full-time occupation. “I’d rather be here in the unit than tiling,” he says. He has some experience with GRP, too. Years ago, he bought an ex-George Best Radford Mini, and has had over 20 Minis since that have received similar wide-arch treatment inspired by the first one. Even now, he has a Yamaha R1 powered project Mini on the go, although it has been on hold during the development of the KLX5.

It was around three years ago that Dave started to have a vision of what he wanted to create, but back then he was only working on it on very occasional evenings. He’d use all manner of materials to develop the shape of the car over his MX-5 ‘manikin’, gradually getting it into the shape it is now. There were never any full drawings of the car, it was created for real, although he did make sketches of certain details, such as the headlights.

It was around 18 months ago that he first made the moulds, and from then on he gave the project more and more time. “I was in the unit at 6am working on the car before going to work, and then back in the evenings. Once I made the moulds, I wanted to see how it would turn out!” The car was completed just in time to make



Dave Wilson built a couple of Toyota MR2 based bodykits before designing his own Mazda MX-5 based KLX5.

a low-key debut in the club fields at the Stoneleigh show.

Once the car was complete, Dave had the challenge of coming up with a name for it. "We went on holiday to Sorento, so I thought I'd name it after that... but there's already a car with that name. My coat of arms is a wolf, but there are already other cars with that name. In the end, I let Mazda keep the 'X5' and I added KL, after my daughters Kerry and Lisa." KLX5 it is, with a wolf as the logo for Dave Wilson Kit Cars.

The fact that the car is fully badged up, including the centre caps of the wheels, is typical of the attention to detail that has been bestowed upon the KLX5. Take a look at the headlights, for instance. The inner part of the lamp is specifically moulded

to accept twin projector headlights, while a strip of LEDs performs the role of the indicator each side. The sidelight is also a neat LED unit. The whole thing is then enclosed with a plastic lens, made by a company that usually makes headlight covers for trains ("they're almost indestructible!" says Dave). It means that you can't play 'spot the donor car' with the KLX5 – it has its own look. It's the same story at the back, where LEDs sit behind a bespoke lens. In this case, it has 'fly eye' trim to further disguise the light source behind.

Also pleasing is the detail development in the car's shape. There has clearly been thought given to the form of the rear end, as just one example, in the sculpting around the diffuser and the impression of

a bumper in the shape. It gives the car a production feel that could easily be absent in a more basic shape. Likewise, the front splitters add some detail to the front – and are more easily replaced than the full front panel if they're caught on a speedbump or kerb. It's backed up by good surface finish and particularly good shutlines. When I mentioned the latter to Dave, he put it down to his tiling experience. "The lines have to be good!"

There are some innovations that have benefitted from Dave's car-building experience rather than that gained tiling. The way he creates the wheelarches, for instance, is new to us. There's no return edge – that would usually be a bad thing, but in this case it's rather cunning. Instead,



Interior is stock Mazda MX-5, but interior upgrades may be offered later.



Tech spec

Engine as tested: 1.8-litre Mazda MX-5.

Engine options: Any 1.6 or 1.8-litre Mazda MX-5 engine. Lots of aftermarket tuning options.

Chassis: Standard Mazda MX-5 monocoque structure.

Bodywork: GRP front and rear panels, doors, sills, rear spoiler and front splitter. Bonnet and bootlid mounted on fabricated steel frames.

Suspension: Front – Standard Mazda MX-5 other than V-Maxx coil-over dampers. Rear – Standard Mazda MX-5 other than V-Maxx coil-over dampers.

Steering: Standard Mazda MX-5.

Brakes: Standard Mazda MX-5 discs all-round.

Kit price: £3700 for all GRP panels, steel frames for bootlid and bonnet and lights.

Budget build cost: From around £6000.

Contact: Dave Wilson Kit Cars, Macclesfield, Cheshire. T: 07746 449445. E: d.wilson710@ntlworld.com



the wheelarch lip is built up with a thick layer of fibreglass. This means that, if you want to increase the wheel size, you can scribe a new opening for the size of the arch and cut it to suit. The thickness of the panel means it's still stable, and to look at and feel you'd never guess that there isn't a conventional return. To prove the point, since the demo car's appearance at Stoneleigh it has moved up to 17in wheels and Dave has reprofiled the wheelarch to suit after the car had been painted.

Another neat trick is the way the spoiler is attached to the boot. Experience with his Ferrari 355 replica build led Dave to the conclusion that it's very difficult indeed to make a spoiler align correctly when it runs across three panels (the bootlid and two

rear quarters). So the spoiler for the KLX5 is supplied separately. Once the body is on the car, you bond the spoiler across all three panels, smoothing it in at the same time. Only then do you cut the spoiler at the existing shutlines, which ensures that the profile matches across all three panels. Clever. And it also means that you can leave the spoiler off if you prefer.

Other features take us back to Dave's tiling – or at least into the kitchen. The front end of the car is bolted on (we'll come to that in more detail later), and the rearmost part of the front wings are fixed top and bottom. This means that Dave had to think of some way to make the vertical profile of the wing match the door. After a couple of evening's thinking, he decided

to mount the adjustable leg of a kitchen cupboard unit to the steel MX-5 shell, and then unscrew it to push the panel out until it was right.

Another part of the car that comes from the shelves of B&Q is the grille. It's made from tiling edge trim, which is a U-shaped section that easily accepts bolts so that the vertical and horizontal slats can be fitted together. "There were some Westfield owners at Stoneleigh who couldn't believe how simple it was," says Dave.

As for the main build itself, once all the unwanted MX-5 panels are stripped from the car the main rear tub is bonded on and the front section is bolted on. New door skins are also bonded in place. But before anything is permanently fitted,



LEDs and bespoke lens covers avoid borrowing lights from a donor.



the sill is placed on a piece of aluminium angle and can be slid back and forth before the position of the main body panels is finalised. That means that all the shutlines can be perfected before you commit any panels to the car. Once that's done, a new bonnet and boot panels are added, and they're mounted to solid metal subframes that accept the hinges.

The kit is priced at £3700, and includes the panels, metalwork for the bonnet and bootlid and lights. There are some parts that Dave doesn't supply, so that customers can personalise their cars to

taste. The main items are wheels and tyres, coil-over dampers and spacers, all of which can then be specified by the builder to suit each other (and those wheelarches can be cut accordingly!). Mirrors are also not supplied; although the donor is based on a Mk1 MX-5, the mirrors are from a Mk2 – although Dave may swap them to Audi TT items. Incidentally, Dave is yet to establish whether the KLX5 kit will fit a Mk2 MX-5 donor.

The only other expenses you need to consider are the cost of a donor (which might be negative depending on how

much you can get for the unwanted parts) and a paintjob. You may also want to retrim the interior, but as the demo stands it's all stock inside. Self-build costs, then, are probably around the £6000 mark. Future options may include GRP panelling for the interior and a hard-top, although a standard MX-5 hardtop still fits.

In a scene where most bodykits are replicas, it's good to see another car that brings bespoke styling to the market. We can't help wondering how Dave's Porsche would turn out. ■



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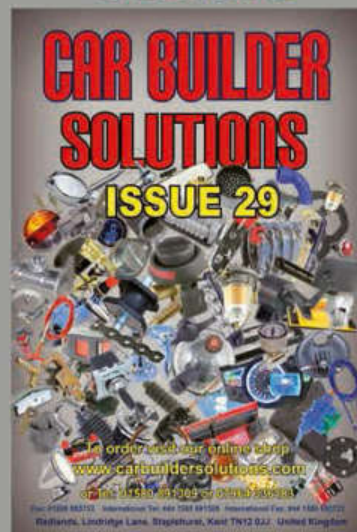
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Words: Ian Stent Pictures: Ian Stent and Ali Cobb

Daytona comes to Goodwood

You could never claim that Goodwood's efforts are half-hearted. During the Revival, the airfield around which Goodwood Circuit twists played host to the largest gathering of Spitfires since the war, which took off from the venue two days later for the Battle of Britain commemorations... Prince Harry on site as well.

And at the Revival itself, Goodwood was once again setting records, this time with all six Cobra Daytona Coupés all gathered in one place. Although they were not all actively raced over the weekend, a demonstration run still made an extraordinary spectacle. As did all of the races at the Revival... it really is fabulous to watch classic racers of all shapes and sizes as they are used to the limit (and on occasion beyond it).

Like the Festival, the Revival has a mind-boggling array of other attractions to keep you occupied. The main trade area is always worth a look, and was where you

would come across displays from Hawk Cars, Gardner Douglas, Great British Sports Cars, Suffolk Sportscars, Nostalgia Cars and Total Headturners.

Behind this area is the always-spectacular public car display car park for pre-1966 machines. Inevitably, a few interlopers also manage to get in, invariably in the form of Cobra replicas and kit based traditional tourers of one description or another.

How Goodwood manages to control the weather, I have no idea, but despite ominous forecasts, the event once again enjoyed three almost completely dry days. Another glorious Goodwood.

www.goodwood.com/grr



Pic: Ali Cobb





Gardner Douglas now a regular Goodwood attendee...



...as if Suffolk with its C-Type and SS100 replicas.



Stirling Moss took a great interest in Nostalgia's Ogle replica.



GBS had a very tidy display with both chassis and complete car.



Total Headturner's impressive stand.



Hawk Cars' aluminium bodied Daytona replica drew the crowds.



Superformance Daytonas line up.



Cisitalia 202 just one of 30 made.



Retail therapy, Goodwood style.



Pic: Ali Cobb

Kits join in at CarFest South

CarFest is now a well established regular of the motoring calendar. Combining music, family entertainment and a whole host of traders, the event really does have something for everyone. The August Bank Holiday weekend was blessed with better weather than forecast.

Club Nova represented the kit car scene by entering the show for the fourth successive year. I had hoped to join the club with my own Nova project, but it wasn't far enough along, so the Apal buggy was called into action instead. Some 'props' were added for the show (matching orange space hoppers and T-shirts) and these proved a real hit. Even Pudsey bear found time to hop along with the club. We had two Novas on display, a Eureka (Australian Nova derivative) my Apal buggy and a Westfield (winning the award for

the muddiest entry!).

Other kit cars were evident across the site, with the Sporting Bears Motor Club offering drives to raise money for Children in Need. An Ariel Atom and Grinnall Scorpion were doing good trade.

Friday night gave everyone the chance to watch *The One Show* rehearsed and delivered in front of the show crowds, followed by live music. Bands included Boomtown Rats, Sophie Ellis Bextor, Paloma Faith, Jools Holland and headliners for Sunday night were Take That. My daughter Martha was less excited than her mother and slept through the Take That set!

Sadly, more rain on Saturday night meant the planned Car Club parade could not go ahead, as the ground would have been churned up too much. Despite this, great fun was had by all.

www.carfest.org



Adrian Newey in a McLaren F1 GTR.



Words and pictures: James Horsley



Colin's Westfield got a little muddy on the way into the event.



James and Martha on their Space Hoppers.



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Hamblin Cadet.



AKS-bodied DD2.

Camels, penguins, Rochdales and Turners. Ordinarily an unusual combination perhaps, but not in late August, when this unlikely grouping come together once a year for the FSCC Historic Specials Day, held at the Cotswold Wildlife Park, near Burford in Oxfordshire.

The Historic Specials Day gives both the knowledgeable enthusiasts and curious day-trippers a rare opportunity to see a number of scarce and often forgotten early kit cars and specials all in one place, and just a few steps away from the resident monkeys, wolves and snakes!

With a strong cross section of 1950s and early '60s specials on hand to inspect, even some of the kids and Japanese tourists visiting the wildlife park seemed to be more attracted to the cars than the neighbouring wildlife – not all quite sharing the same space, naturally!

This year's event attracted an exceptional variety of cars, helped

in part by glorious sunshine, with a good number of the pioneering British kit car marques represented. These included an impressive spread of Fairthorpes, Turners, Rochdales, Ashleys and Tornados, supported by some appealing early Lotus Sixes and Sevens.

Among the rarer specialist sportscars in attendance were an intriguing selection of Bucklers, including a charming AKS-bodied DD2 and Mk VI, plus Hamblin Cadet and Speedex Austin Seven specials, a pair of Watford Cheetahs, two Dellow's, and an unusual one-off 1957 Martin Ford special, fresh from its recent extensive restoration.

The stunning low-drag WB Special coupé attracted considerable interest, as did the unique 1958 Wingfield Bristol, a Saab-powered Berkley and a scarce Turner GT, one of just 10 examples built before this marque went under in 1966. ■



WB Special.

Words and pictures: Gary Axon



Rochdale Olympic.



Marlin mash-up

Words and pictures: Ian Stent



This was no ordinary company open day. Following the loss to bile duct cancer of her husband Mark last year, Marlin Cars' MD Terry Matthews always promised she would organise a day to celebrate his life while generating funds for the charity, AMMF (that supports sufferers and invests in research) and also Hospiscare.

Mark's Day had all the things that he would have loved, from clay pigeon shooting to several live music acts and a special gathering of friends in the evening, with yet more music and fireworks. Terry had worked ceaselessly to make it a success, with radio interviews in the weeks leading up to the event and gathering support from a wide range of singers, entertainers and suppliers. Thanks must go to all those who helped.

Centre stage was rightly a massive display of privately owned Marlins, of all vintages and model derivatives... Mark's legacy most certainly lives on!

Visitors were then able to walk around the Marlin factory unit and indulge in some great hot food, before walking out to try the shooting (Stent did adequately!), archery or watching a great bicycle stunt display. And everywhere there were reminders of Mark, from a remembrance 'tree' to specially commissioned wooden bench. If you want a flavour of the event, scan the QR code below or hit the play button in the digital app.

Vitality, the day raised a spectacular £8000.

www.marlin-sportscars.co.uk

www.ammf.org.uk

www.hospiscare.co.uk



Mark's Day cup cakes.



Clay shooting for those who fancied a go.



Bench near workshop in Mark's honour.



Great food available throughout the day.



Sound Of The Sirens was one of a number of excellent groups playing.



Fabulous display of Marlins, with all derivatives present. A fitting tribute to Mark Matthews (above left).



Joe Seddon put on a great display.



Remembrance 'tree' for hanging messages.

ALUMINIUM RACING JACKS

BEST SELLER

• Quick lift
• Non-marking nylon wheels
• Rubber contact pad - helps protect vehicle undersides

• steel chassis

MODEL	EXC.VAT	INC.VAT
1.25 tonne	£84.99	£101.99
2 tonne	£149.98	£179.98
2.5 tonne*	£139.98	£167.98

LOW ENTRY ONLY 85MM

Clarke RACING

Clarke 2 TONNE TROLLEY JACKS

FROM ONLY £19.98 EX.VAT

CTJ2001G

MODEL	TYPE	EXC.VAT	INC.VAT
CTJ2B	DIY	£19.98	£23.98
CTJ2MB	DIY	£24.99	£29.99
CTJ250LP	* Low Profile	£39.98	£47.98
CTJ20LG	Pro Instant	£69.98	£83.98
CTJ2001G	Pro Garage	£74.99	£89.99
CTJ2GLC	Pro Long High Lift	£169.98	£203.98

* CTJ250LP has a 2.25 tonne capacity, has a low entry of only 80mm and includes 2 sockets

Clarke AXLE STANDS

• Ratchet action for quick height adjustment
• Sold in pairs

3 TON & 6 TON MODELS

FROM ONLY £19.98 EX.VAT

MODEL	TONS	MIN/MAX HEIGHT	EXC.VAT	INC.VAT
CAX-31BC	3	300-430mm	£19.98	£23.98
CAX-6TBC	6	400-615mm	£29.98	£35.98

Clarke AUTOMOTIVE WHEEL DOLLY SET

AWD1

BIG 3" CASTORS

• Four swivel castors for easy movement in confined spaces
• Heavy duty steel construction - load rating 500kg per dolly

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CWH6

£39.98 EX.VAT

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• Activates instantly when Arc is struck
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• Suitable for arc, MIG, TIG & gas welding

Clarke NO GAS/GAS MIG WELDERS

• Uses flux cored steel wire, which creates own gas shroud as it burns

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MODEL	AMPS	EXC.VAT	INC.VAT
90EN	24-90	£169.98	£203.98
105EN	30-100	£184.99	£221.99
151EN	30-150	£209.98	£251.98
160EN	30-150	£259.98	£311.98

Clarke MIG WELDERS

Quality machines from Britain's leading supplier

See online for included accessories

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MODEL	MIN-MAX AMPS	EXC.VAT	INC.VAT
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110E	30-100	£214.99	£257.99
135TE Turbo	30-130	£239.98	£287.98
151TE Turbo	30-150	£269.98	£323.98
165TE Turbo	30-155	£339.00	£406.80
175TECM Turbo	30-170	£399.00	£478.80
205TE Turbo	30-185	£429.00	£514.80

* was £490.80 inc.vat # was £539.98 inc.vat

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Clarke 3 TONNE JACKS

QUICK LIFT

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JACKS ALSO IN STOCK UP TO 5 TONNE

CTJ3000G

MODEL	TYPE	SADDLE HEIGHT	EXC.VAT	INC.VAT
CTJ3000QL	Quick Lift	195-520	£44.99	£53.99
CTJ300L	Pro Instant	145-520	£83.99	£100.79
CTJ3000G	Pro Garage	145-520	£84.99	£101.99

Clarke CAR RAMPS

• Lift cars safely and quickly
• Tough angled steel construction

FROM ONLY £26.99 EX.VAT

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MODEL CAPACITY EXC.VAT INC.VAT

MODEL	CAPACITY	EXC.VAT	INC.VAT
CR2	2000KG	£26.99	£32.39
CRW25	2500KG	£36.99	£44.39

Clarke HYDRAULIC BOTTLE JACKS

NEW

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FROM ONLY £7.99 EX.VAT

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2 tonne	£7.99	£9.59
4 tonne	£11.99	£14.39
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6 tonne	£14.99	£17.99
10 tonne	£17.99	£21.59
12 tonne	£24.99	£29.99
20 tonne	£34.99	£41.99

Clarke CAR CREEPERS

• Oil resistant vinyl covered padded backs & headrests
• Swivel castors for easy manoeuvrability

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£26.99 INC.VAT

MODEL	DESCRIPTION	EXC.VAT	INC.VAT
CRC36	Car creeper	£21.99	£26.99
CRC45	With adjustable headrest	£28.99	£34.79
CRC50	Folding car creeper	£44.99	£53.99

Clarke NO GAS/GAS MIG WELDERS

• Professional type torch with on/off control
• Thermal overload protection
• Turbo fan cooled
• Easy conversion to gas with optional accessories

FROM ONLY £109.98 EX.VAT

£131.98 INC.VAT

MIG145

no gas only # was £203.98 inc.vat

MODEL	MIN/MAX AMPS	EXC.VAT	INC.VAT
MIG 120NG	35/90	£109.98	£131.98
MIG 145	35/135	£149.98	£179.98
MIG 152	40/140	£164.98	£197.98
MIG 180	40/160	£179.98	£215.98
MIG 196	40/180	£199.98	£239.98

Clarke ARC WELDERS

For home user, automotive and industrial applications.

FROM ONLY £49.98 EX.VAT

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SEE THE FULL RANGE ONLINE & IN-STORE

***Turbo fan cooled**

MODEL	AMPS	EXC.VAT	INC.VAT
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EA165	65-160	£64.99	£77.99
115N	30-110	£64.99	£77.99
EA200	60-200	£87.99	£105.99
160N	40-150	£67.99	£81.59
190N	50-185	£94.99	£113.99
190TEN#	35-180	£139.98	£167.98
235TEN#	40-210	£149.98	£179.98

* was £107.98 inc.vat

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• Inc. 17, 19, 21 & 23mm chrome vanadium sockets
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CIR220

OTHER MODELS

MODEL	MAX TORQUE	EXC.VAT	INC.VAT
Cordless CFW1000	450Nm	£56.99	£68.39
Cordless CIR450C	450Nm	£119.98	£143.98

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KIT1100

- Gravity Fed Spray Gun
- Air Wash Gun
- Tyre Inflator
- Air Blow Gun
- 5 Metre Air Recoil Hose

Also available 3 pce Air Tool Kit - KIT600 Paraffin spray gun, tyre inflator & blow gun

Only £14.99 EX.VAT £17.99 INC.VAT

Clarke HIGH FREQUENCY BATTERY CHARGERS

HFBC12/24

- Energy efficient inverter, protects battery from high current damage
- Microprocessor provides appropriate charging rate
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MODEL	CHARGE BATTERY	EXC.VAT	INC.VAT
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HFBC12/24	20 Amps 200Ah	£69.98	£83.98

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• Multi-position charge regulator
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BC520N

MODEL	MAX AMPS CHARGE/BOOST	EXC.VAT	INC.VAT
BC100N	15/100	£47.99	£57.59
BC130C	15/120	£61.99	£74.39
BC190	38/180	£89.98	£107.98
BC210C	35/120	£94.99	£113.99
BC410E	15/400	£119.98	£143.98
BC205N	30/200	£169.98	£203.98
BC520N	50/510	£179.98	£215.98
BC430N	60/400	£369.00	£442.80

* was £155.98 inc.vat # was £227.98 inc.vat

Clarke PRO 7" SANDER/POLISHER

CP185

Includes hook & loop backing pad and hook & loop wool polishing bonnet. • 1200w motor

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• 6 interlocking foam tiles protect flooring & provide comfort when standing or kneeling
• Each tile is 610x610mm & includes detachable, yellow borders

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CAG800B

INC. DISC & HANDLE

MODEL	DISC (MM)	MOTOR	EXC.VAT	INC.VAT
CAG800B	115	800w	£22.99	£27.59
CON1050B	115	1050w	£27.99	£33.59
B&D CD115	115	710w	£29.98	£35.98
CAG2350B	230	2350w	£42.99	£51.59

Clarke ENGINE CRANES

FROM ONLY £149.98 EX.VAT

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CFC100

Folding and fixed frames available

Robust, rugged construction

• Overload safety valve

Fully tested to proof load

MODEL	DESC.	EXC.VAT	INC.VAT
CFC500F	1/2 ton folding	£149.98	£179.98
CFC100	1 ton folding	£154.99	£185.99
CFC1000LR	1 ton long reach	£189.98	£227.98

Clarke INDUSTRIAL AIR COMPRESSORS

Offers the durability & reliability demanded by professionals.

- Cast iron pumps on SEV11C, SE16 and SE19
- Twin cylinder pumps (except SE11)
- Motor overload protection
- Petrol models available

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H/DUTY

MODEL	CFM	MOTOR (HP)	RCVR (LTR)	EXC.VAT	INC.VAT
SEV11C	9	2	100	£369.98	£443.98
SE16C100	14	3	100	£399.00	£478.80
SE16C150	14	3	150	£429.00	£514.80
SE16C200	14	3	200	£499.00	£598.80
SE18	18	4	200	£549.00	£658.80
SE26	23	5.5	200	£679.00	£814.80
SE29+	28	2x3	270	£969.00	£1162.80
SE36	30	7.5	270	£979.00	£1174.80
SE37+	36	2x4	270	£1099.00	£1318.80
SE46	40	10	270	£1449.00	£1738.80

*230V Supply + Run From 30 Amp Supply + Run From 40 Amp Supply + 400V 3 Phase + Supplied With Direct On-Line Starter (Supplied With Sequential Direct On-Line Starter + V-Twin # Supplied With Pre-Wired Star Delta Starter

* was £526.80 inc.vat # was £622.80 inc.vat

* was £682.80 inc.vat # was £826.80 inc.vat

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Clarke 3HP V TWIN AIR COMPRESSORS

FROM ONLY £219.98 EX.VAT

£263.98 INC.VAT

- Suitable for powering all common air tools & spray equipment

TIGER 16/510

MODEL	AIR RECEIVER	DISPLACEMENT	EXC.VAT	INC.VAT
Tiger 16/510	50 litre	14.5 cfm	£219.98	£263.98
Tiger 16/1010	100 litre	14.5 cfm	£269.98	£323.98

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• Dual scale calibration in 0.01mm & 0.0005" units
• Locking screw feature for batch measurements
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CM145

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Clarke ENGINEERS HEAVY DUTY STEEL WORKBENCHES

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• Sturdy lower shelf
• Durable powder coated finish

INCLUDES SINGLE LOCKABLE DRAWER

Shown fitted with optional 3 drawer unit ONLY

£84.99 Ex.VAT £101.99 Inc.VAT

MODEL	DIMS WxDxH (mm)	EXC.VAT	INC.VAT
CWB1000B	1000x650x880	£149.98	£179.98
CWB1500B	1500x650x880	£199.98	£239.98
CWB2000B	2000x650x880	£259.98	£311.98

Clarke MECHANICS PROFESSIONAL TOOL CHESTS/CABINETS

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£63.99 INC.VAT

NOW INCLUDES BALL BEARING ROLLER DRAWERS

35KG MAX DRAWER LOAD

MODEL	DESCRIPTION	DIMS WxDxH (mm)	EXC.VAT	INC.VAT
CTC600B	6 Dr chest	600x260x340	£52.99	£63.99
CTC900B	9 Dr chest	610x255x380	£64.99	£77.99
CTC500B	5 Dr cabinet	675x335x770	£119.98	£143.98
CTC800B	8 Dr	610x330x1070	£104.99	£125.99
CTC700B	7 Dr cabinet	610x330x875	£129.99	£149.99
CTC1300B	13 Dr chest	620x330x1320	£149.98	£179.98

Clarke JET9000 JETSTAR PRESSURE WASHERS

• JET8000 & 9000 include hose reel + Detergent applicator for extra cleaning power

FROM ONLY £54.99 EX.VAT

£65.99 INC.VAT

MODEL	MOTOR	CFM	TANK	EXC.VAT	INC.VAT
Tiger 8/250	2Hp	7.5	24ltr	£79.98	£95.98
Tiger 7/250	2Hp	7	24ltr	£89.98	£107.98
Tiger 11/250	2.5Hp	9.5	24ltr	£119.98	£143.98
Tiger 8/510	2Hp	7.5	50ltr	£129.98	£155.98
Tiger 11/510	2.5Hp	9.5	50ltr	£149.98	£179.98

Clarke HYDRAULIC PRESSES

PROFESSIONAL QUALITY

Built for tough daily use in automotive/industrial workshops

- All models include gauge

MODEL	EXC.VAT	INC.VAT
4 ton bench	£129.98	£155.98
10 ton bench*	£189.98	£227.98
12 ton floor	£239.98	£287.98
20 ton floor	£399.00	£478.80
50 ton floor#	£1598.00	£1917.60

* was £1978.80 inc.vat

Available with/without 7 pce pin, bracket & pressing plate # without kit

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£155.98 INC.VAT

Clarke X-PRO AIR CAT131 CAT127

HUGE CHOICE IN-STORE/ONLINE

FROM ONLY £19.98 EX.VAT

£23.98 INC.VAT

MODEL	DESCRIPTION	EXC.VAT	INC.VAT
CAT127	3" Cut off tool	£22.99	£27.59
CAT128	1/4" Die Grinder	£19.98	£23.98
CAT131	1/2" Impact Wrench	£59.98	£71.98
CAT132	13pc 1/2" Impact Wrench Kit	£74.99	£89.99
CAT133	3" Cut Off Tool & 1/4" Die Grinder & 33 piece set	£47.99	£57.59
CAT134	1/2" Reversible Ratchet	£34.99	£41.99
CAT136	6" Dual Action Sander	£34.99	£41.99
CAT137	3/8" Keyless Reversible Drill	£34.99	£41.99
CAT139	150mm Air Hammer inc 4 Chisels	£19.98	£23.98

Clarke JUMP STARTS

Provides essential home, garage and roadside assistance
• Integral work light
• 910 includes air compressor
• Long life battery

MODEL	START BOOST	PEAK AMPS	EXC.VAT	INC.VAT
900	400A	900A	£52.99	£63.99
910	400A	900A	£59.98	£71.98
4000	700A	1500A	£114.99	£137.99
12/24 1000A@12v	2000A@12v		£129.99	£155.99
500A@24v	1000A@24v			

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EXTRA LONG 1m LEADS

HEAVY DUTY 17KG

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Clarke HEAVY DUTY INSTANT GARAGES/WORKSHOPS

• Ideal for use as a garage/workshop • Extra tough triple layer weatherproof fabric
• Heavy duty powder coated steel tubing
• Ratchet tight tensioning

ZIP CLOSE DOOR

FROM ONLY **£219.99** EX.VAT
£262.99 INC.VAT

MODEL	SIZE (LxWxH)	EXC.VAT	INC.VAT
IG1015	4.6 x 3 x 2.4m	£219.99	£262.99
IG1216	4.9 x 3.7 x 2.6m	£259.99	£310.80
IG1020	6.1 x 3 x 2.4m	£269.99	£322.80
IG1220	6.1 x 3.7 x 2.5m	£299.99	£358.80
IG1224	7.3 x 3.7 x 2.5m	£379.99	£454.80

10' RANGE NARROWER WIDTH GREAT WHERE SPACE IS TIGHT

LENGTH UP TO 24'

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NEW RANGE

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Tiger2600	170/2465	4	£259.98	£311.98
Tiger3000	200/2900	6.5	£329.98	£395.98
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Fault code reader		
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Devil 650	15	£74.99	£89.99
Devil 660 SS	15	£109.98	£131.98
Devil 850	12.4 - 31	£129.98	£155.98
Devil 860SS	31	£149.98	£179.98
Devil 1850	26.9 - 58	£299.98	£359.98
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G1200	1.1	-	£149.98	£179.98
G2500	2.4	6.5	£189.98	£227.98
FG3005	2.8	7	£239.98	£287.98
FG3050	3	8	£269.00	£322.80
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CVAC25SS	1400W	£64.99	£77.99
CVAC30SS	1400W	£86.99	£104.39

Clarke ENGINE STANDS

FROM ONLY **£49.98** EX.VAT
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• Rotates through 360°
• Fully tested to proof load

NEW RANGE

MODEL	CAPACITY	EXC.VAT	INC.VAT
CES340	340kg	£49.98	£59.98
CES500A	227kg	£54.99	£65.99
CES450	450kg	£69.98	£83.98
CES750A	340kg	£79.98	£95.98
CES560	560kg	£84.99	£101.99
CES680F	680kg	£119.98	£143.98

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FROM ONLY **£79.98** EX.VAT
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• Fast snap connector attachments for quick & easy assembly • Hydraulic pump, ram & hose with various tubes, pieces & connectors
• Includes metal case • Fast action pump

MODEL	CAPACITY	EXC.VAT	INC.VAT
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CS4BRK	4 tonne	£79.98	£95.98
CS10BRK	10 tonne	£139.98	£167.98
CS10BRK*	10 tonne	£149.98	£179.98

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Top quality chrome vanadium steel

• 18 Sockets 8-32mm
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LIFETIME GUARANTEE

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Clarke VAC KING WET & DRY VACUUM CLEANERS

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CVAC30SS	1400W	£86.99	£104.39

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CS4BRK	4 tonne	£79.98	£95.98
CS10BRK	10 tonne	£139.98	£167.98
CS10BRK*	10 tonne	£149.98	£179.98

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Top quality chrome vanadium steel

• 18 Sockets 8-32mm
• Reversible ratchet
• Comfort grip handle

PRO155

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Race Diaries

Our Race Diaries contributors have been kept busy by their motorsport activities, whether on the circuit, at an autotest, on the hill or in the garage. Here are their latest updates...



Jack Walton

DISCIPLINE

Circuit racing

RACES

Pro Comp LA Gold

CHAMPIONSHIP/SERIES

750MC Sports Specials

AGE

56

OCCUPATION

Production supervisor

I had a plan. It all went pants, but at least I had a plan.

After the sharp new car learning curve of Cadwell Park, Snetterton was the opportunity to build on it. It has been a couple of years since my last trip to Snetterton and I had forgotten what the drive to the circuit was like. Possibly the only journey to a UK race track that involves driving through a forest.

I arrived spot on to the approved circuit entry time on Friday afternoon. Now, either 75 per cent of the meeting's entrants had been testing all day on Friday, or they do not work on Fridays... or both. The place was packed but we found a nice spot down by the scutineering bay. This included a substantial fence to cable tie the tent to should Snett weather perform to its normal standard of howling gales.

I had not been to Snetterton since they changed the corners at Sear and Coram, renamed others and added a wiggly bit in the middle of what used to be a field. Part of my 'plan' was to use my bicycle to check out the changes. In the company of Billy Fletcher (Hornet Mk2) and Ed Fuller (Tiger Super Six), we set off from the start line on Friday night.

Having lost one pedal from my bike en route, I had engineered a temporary solution. The bodge parted company from the bike by the time we got to Riches. One-legged peddling got me as far as what used to be Sear and is now called Montreal. Even with the best advice from Billy, this looked like it could be a challenge.

Thankfully we would not be using the 'wiggly bit in the middle of what used to be a field'. The broken bike had lost its novelty by this point so I headed back to the paddock intent on checking out Coram on foot as Ed and Billy disappeared grinning into the distance.

Well, you know how these things happen, one beer led to another, we told lies about the weight and bhp of our cars, tested out a few of the excuses from the well known book *1001 Racing Driver Excuses* and, by the time the subject of Coram came up, it was pitch black outside. So to bed. I mean, how much could a corner change?

Unusually, in my experience at Snetterton, it was not chucking it down with rain, nor was the wind of gale force proportions. Snetterton obviously has its good points, but the paddock layout is not one of them. Behind the garages is sensibly organised, the



Above: Jack's first time at the 'new' Snetterton layout. Also his first time there without a gale or torrent...

remainder is a mess of odd bits of grass and tarmac here and there. While on my way to the collecting area for qualifying, still muttering to myself about rubbish paddocks, I missed the turn for the collecting area. OK, I had forgotten completely where it was.

I was pointed in the right direction by a very helpful marshal. I love regional accents; I wish I could put this guy's accent down in print. Suffice to say he made Lewis Beales sound as though he used Received Pronunciation.

After the blind corners, elevation changes and tightness of Cadwell, the wide open spaces of Snetterton was a huge change. The tight turn at Montreal onto the Bentley straight was certainly a surprise. Using a one-peddled pushbike is one thing, trying to take this corner at speed is another.

Qualifying was never going to be a balls-out affair, more a speedy refamiliarisation with the circuit plus test session. The lack of top end revs was still an issue, with nothing much happening past 6250rpm. Cars with similar engines sailed past on the Bentley straight. When the results came

out, it was not surprising to find I was on the back row of the grid sharing it with a MEV MX150R.

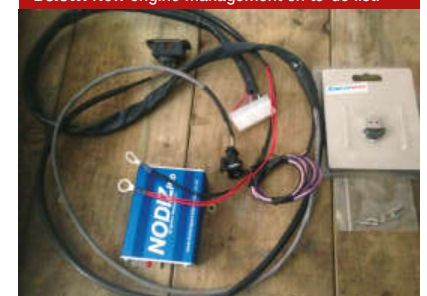
There was a nice long gap between qualifying and race one. Once post-qualifying car checks were complete, it left lots of time for gossip, tea-drinking and watching some racing. During this period, I was again stalked by the camera wielding duo of Nick and Mark Rogers. Once the pleasantries regarding age, weight and racing ability had been exchanged, Nick was looking for a photo.

After the overcast weather of Cadwell, Nick was curious as to the readability of my matchbox sized SPA dash in the much brighter Snetterton. I went to start the car... click. Switches checked, click, battery checked, click, jump leads on, click. On checking the starter wiring, I found the positive lead had snapped. It really was a case of "it came off in me hand, sarge." It always feels that I take too many spares racing yet, despite this, no 8mm ring connector could be found. One was eventually donated by a fellow Sports Specials driver who will be repaid in beer at Mallory Park. Beer, or more

Below: Repacked silencer left Pro Comp whispering.



Below: New engine management on to-do list.



“Using a one-peddled pushbike is one thing, trying to take Montreal corner at speed is another”

likely a hamper full of number one mechanic Rachel's finest food, will repay the technical and photographic assistance given by Mark and Nick Rogers. Thanks chaps.

The post Cadwell re packing of the exhaust can certainly paid off, “94dB” said the nice lady with the testing machine prior to race one. A well-made Procomp can and £40 of Acousta-Fil did the job. Lights out and a stuttering start as various cars bogged. Stop, go, stop, go, stop... and away we go.

In short order, this turned into a much higher speed test session than qualifying, being more about relearning the Snetterton 200. Part of the challenge was to take more speed in to and out of Montreal which, despite the best advice of Billy Fletcher, led to some interesting lines. The new version of Coram came with its interesting moments, too. It was long before, but at least it straightened a little bit before what was Russell bend and is now Murrays. Now the corner just goes on and on and on, it is utterly brilliant and a real challenge to get it right. I was still down on power, but the handling remained very good, which was just as well as I was enjoying the odd joust with the MEV MX150R which just pipped me at the finish.

Saturday night was spent looking at the timings from race one, looking at the other Sports Specials machinery and meeting a few of the drivers. I took special note of the MEV MX150R with which I had had a bit of a joust and found it had been driven by one Sylvia Mutch. Once I had the car sorted post race, I went off to find Ivan and Matt from Procomp who had built my car. They not only build a good car, they are also a mine of information on all things 750MC, past present and future.

Sunday morning dawned with still



Above: Sylvia Mutch in her MEV MX150R (a racing Exocet) provided a close battle in both races.

no torrential rain or howling wind, so I remained unconvinced this was actually Snetterton. I was up at 6am, got the tent away and decamped to the area next to Tiger Racing's lorry ready for a swift getaway post race. Fuel usage from the previous day logged, minimum weight refuel, spanner check, suspension settings and tyre pressures completed.

Breakfast was followed by a brake bleeding session on Billy Fletcher's Mk2 Hornet which had minimal (zero) brakes by the end of race one. To further eliminate potential issues with regard to my car's lack of top end power, Billy checked the timing just to see if the advance was actually moving. This proved to be OK as far as could be ascertained away from the garage. The hunt for power continues.

For race two, I found my way to the collecting area without the aid of a guide and I awaited the arrival of Ms Mutch. I had spent part of the morning comparing lap times and understood that this is who my part of the race would be with and had no intention of

being pipped on the last lap this time. The very nippy and good handling Class C MEV MX150R versus my Class B 1800 Procomp LA Gold.

The pace of most cars appeared to have increased since race one on Saturday, myself and Ms Mutch included. We must have traded places six times. Brilliant fun and being pushed also made me push the car and myself a little more each lap as I could not shake the attentions of the MEV, but crossed the line first.

By the time the chequered flag came out, I knew I had been in a race. The car, other than its regular power foibles, had performed well and its driver had learned more about Snetterton and himself. I caught up with Sylvia Mutch and congratulated her on a hard fought race. I will be missing the Castle Combe races but we have agreed to renew our battle at Mallory Park. There could well be a NoDiz ECU from Motorsport-Electronics in Westbury and some nice round gauges fitted by then.



Ian and Chris Chapman

DISCIPLINE
Autotesting

RACE
Sylvia Riot and Raw Striker

CHAMPIONSHIP/SERIES
BTRDA Autotest
Championship

AGES
54 and 26

OCCUPATIONS
Cabinet maker and junior
architect

It's not been the best autotest season so far this year. It's been like waiting for a bus, nothing comes along for ages then two arrive at once. So our next quest for adventure, before dementia, took us north to Hartlepool for the first part of a double-header, then back down to Sherborne-in-Elmet for our home event on Sunday.

Hartlepool ran three nice open tests, tackling each one six times, after learning them we had the driver briefing. I'd asked if anyone would mind if we ran out of class order, pushing in so we could finish early, as we had to set up our home event on the way home, something we would normally do on the Friday night, but no-one was free then to do it.





Above: Ian and the Riot in action at the Alwoodley autotest.



Above: Ian with his new co-driver... maybe.

Luckily, there was no chance of rain so everyone was happy. Between us we managed 36 tests in under two hours. Lucky we were the first to arrive at Sherborne as I'd designed the tests and had the diagrams with me. Chris, Phil and I soon had the tests set up.

Chris wasn't competing on Sunday as it was his girlfriend's birthday party (autotesting is great fun but will never compete with an adult size bouncy castle!). We were both keen to see how we'd done on Saturday, only to find out that, while they were packing up, someone snuck into their van and made off with the cash/cheques, all our entry forms and the laptop with the only results on. Game over.

Everyone soon put Saturday's event behind them and got stuck into our tests. The feedback we were getting from everyone was positive, so the running around like headless chickens on Saturday was worth it. The Riot was flying all day and was only let down by the gearbox

jumping out of reverse. It turned out the reverse gear just needed moving up a bit. I like talking technical. Alwoodley Motor Club, the marshals and the competitors all appeared to enjoy the day's motorsport under the Yorkshire sunshine.

Our next outing was a long overdue trip north of the border to bonny Scotland. The last time I raced there it was in Glasgow. At the end of the day we were asked to "haste back" (in a Scottish accent). That was 15 years ago, and boy was it worth the wait!

South Scotland Motor Club put on the best two day event I've ever done. Saturday was the championship round and Sunday was a fun day. As it was the first big autotest in Scotland for years, a large number of the top Irish lads had crossed the water to take home all the silverware.

Gordon Glendenning and his team had really gone to town with the venue; it was like the F1 of

autotesting. We had areas for the spectators, official programs, TV coverage and my personal favourite was the large digital display at the end of each test. The tests were fantastic, long flowing with technical bits and fun bits. We both had a good result, Chris finished second in class and not far behind, I was in third.

There was a presentation in the hotel Saturday night and they picked teams for Sunday made up of a Scottish, an English and an Irish driver. Only I could be teamed up with a lovely Irish man called Paddy Power!

When we got our trophies for the class wins, it was brilliant to be given not the usual wine but a bottle of Iron brew and a chocolate teacake. We won't talk about Sunday as I beat Chris and I don't want him thinking I'm bragging. On reflection, it was a bad decision to go to Scotland as it has spoilt autotesting for me as they have set the bar so high! Hopefully we'll "haste back" soon.



Alisdair Suttie

DISCIPLINE
Hillclimbing

RACES
Sylva Leader

CHAMPIONSHIP/SERIES
BHC Leaders
Championship

AGE
41

OCCUPATION
Motoring journalist

There comes a point in every project where you have to admit to yourself there has been a lack of momentum. What you do about that is what determines whether or not the project will be completed how you envisaged it or it ends up as another unfinished kit on everyone's favourite auction site.

My Sylva Leader was in danger of tipping into the category of long, drawn-out project with no end in sight. This is why I decided to concentrate on having fun in the car over the drier summer months and just enjoy the bark of the Honda Fireblade carbs as they suck air and fuel into the Ford Crossflow engine.

So, there has been no hillclimbing in the Sylva and very little else worked on. There has been a lot of planning, however, and for 2016 I have a list of all the parts required. It's helped

enormously having a friend who works for an MX-5 specialist as I'm planning on the swap from Crossflow to MX-5 1.8-litre motor over the winter. Anyone

interested in a fully working 1600cc 711M block Crossflow can get in touch through the editor.

Other parts have also been accruing,

Below: Suzuki Hayabusa powered Empire at Gurston Down. A serious bit of kit...





Above: Andrew Russell's immaculate Ginetta G15



Above: Audi S8 substituted Sylva at Shelsley...



Above: ...and Toyota GT86 did the job at Gurston.

such as the electrical cut-out to mount on the dash when it's reworked with a digital dash. It might not be in keeping with the Sylva's 1986 build date, but a digital dash is lighter, far more accurate than the optimistic Smiths instrument currently in place, and it declutters the dash.

As I mentioned in my last report, the MoT test was looming for the Leader and, as I write, it's away with a local specialist who is used to dealing with classic cars. He'll take care of a couple of minor points before taking it for the MoT test.

Practicality dictates this as the best

route to having the car back on the road as my time has been taken up with a family holiday, hillclimbing in the Multi Car Hillclimb Challenge and sorting out a new daily set of wheels. Being somewhat picky meant the last of those tasks took longer than anticipated, but has resulted in a very handsome daily driver.

As for hillclimbing, the Multi Car Hillclimb Challenge continues and I was back in action at Shelsley Walsh in nothing less than an £80,000 Audi S8. It was the least likely hillclimb car there and was something of a joke for most people

at first. Then it turned into the star attraction thanks to some amazing times.

Next up was a Toyota GT86 at Gurston Down, which was not as quick or able as we'd hoped. It didn't help the Sunday competition runs were plagued by wet weather. Still, by the time you read this, we will have competed at Prescott and Doune and just have Loton Park left to go.

After that, I will finally have my weekends back and work on the Sylva will start in earnest to make sure the car never appears as a half-finished project.



John Pick

DISCIPLINE
Hillclimbing

RACES
Adrenaline Murtaya

CHAMPIONSHIP/SERIES
Avon Tyres/TTC Group
MSA Hillclimb Leaders
Championship

AGE
57

OCCUPATION
Project manager/director

Flying Elises dominated practice for the September round of the MSA British Hillclimb Championship at Prescott, near Cheltenham. In quick succession, two went flying – but not in the speed sense. One so much so that it cleared the gravel trap, barrier, three spectators and the field fence behind to land with the cows.

So, without attempting aviation as a theme, we decided to see if we could keep the AMS Murtaya clearly on terra firma. First practice on the Saturday was one of those wet-in-places runs we all have to manage at times. However, at the start it was dry and it was only as you approached the ultra fast Orchard corner that you discovered it might still be damp! With the tail steering the car, it was very tippy-toe round and thereafter I was clearly seeking out and using the more obvious dry parts of the track. Second practice was back to normal and consistently dry if a little lacking in grip. Noticeably, in the damp conditions we were only 1sec off the pace, but in the dry that was up to 5sec. The 4WD really showed on the start line – to 64ft the car was 0.5sec quicker.

The Murtaya has always been a bit light on grip at the rear end, but Orchard in particular exposes this. So in the light of experimentation, we decided to ballast the car to see what effect it would have. So there we are Saturday afternoon in B&Q wondering which sand to buy? Sharp, kiln dried or play sand? The answer, quicksand of course! In the week before we had also stiffened the car a bit structurally by solidly bolting on the roof front and rear.

We had a practice run Sunday

morning and, whilst a bit slower than the day before, it felt a bit better, indicating that maybe we should reduce the rear spring rate to give the car a bit more grip. So to the first timed run and again through Orchard we had a bit more grip but then come the last corner, the fresh air Semi-circle and the extra weight in the rear caught me out and we disappeared over the edge and a long way down the bank.

The consequence of this is usually any end to it all with dire damage to car and even to driver, but the Murtaya being based on the hardy Subaru underpinnings, bounced its way down the grassy bank until it met an arresting bank and then I was able to select first and the 4WD took me back up the hill to meet the marshals running down. I proceeded to the finish and even recorded a time! The afternoon

run had to be a bit more circumspect, so we ditched the sand instead of the car and had a steady run that was almost the quickest of the weekend.

All of this had followed on from Wiscombe Hillclimb in July. That I had done in the trusty Austin Cooper S, which had involved jamming in the tent and everything for camping. Saturday was so wet that on one run I was quicker than several Caterhams. Part of the motivation for this was we had put the Murtaya up for sale to see if anyone was interested, so we did not want to use it. With no offers to date, it made sense to advertise it by using it.

We have a few more modifications planned now based on spring rates and extending the roll hoop to add a front cage. At this rate the Murtaya will be fully sorted by the time we sell it! ■

Below: Some ballast was added to the Murtaya to aid rear-end grip. The results were mixed...



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The same but **DIFFERENT**

Take two MEV Exocet kits, build them simultaneously and then compare the finished result...

Words and pictures: Adam Wilkins





A game of spot the difference? One of the great joys of building a kit car, particularly one from the more affordable end of the market, is the scope for personalisation. By their very nature, cheaper kits tend to be more basic and allow even more freedom to go your own way. Lining up these two Exocets proves the point to a tee. It's an even more interesting exercise when you realise that both cars were built at the same time, and a friendship between the two builders inevitably meant that there was some cross-pollination of the ideas they'd incorporate into their projects.

Both had first seen the Exocet in *Complete Kit Car* magazine before deciding that it was the kit for them. For John, who had built a Nova a few decades earlier, it would be a father-and-son project with son Luke, who turned 17 at around the same time the car was finished. John liked the fact that there were very few shutlines to worry about, as he felt it was an area that lets many self-built cars down. In fact, he went on to eradicate the one panel gap the Exocet has by making the nose and bonnet one piece. Luke, meanwhile, was sold on the Exocet's appearance. "I thought it looked cool, and really wanted us to build one. I never thought it would actually happen, though," he says.

They still have a video where they 'pitched' the project to Luke's mum as a father-and-son pursuit, gaining her agreement to go ahead with it. Similarly, Chris's wife was instrumental in selecting the Exocet as its affordability meant that there wasn't too much at risk if his first kit car project didn't go to plan.



Both cars have bespoke tubular centre tunnels created by their respective builders. John's features curved tubes while Chris's is composed from more conventional straight tubes.



As you'll know if you caught the build story of these two cars in the last issue, Chris and John shared a hire van to collect their kits from the MEV factory. It was the first time they'd met, having previously communicated via the MEV owners' forum. Coincidentally, the day they collected their kits from the MEV factory was the same day we were there to photograph a gathering of MEV models for the cover feature of the Stoneleigh 2013 (issue 74) issue – and Chris and John are even in the background of one of the photos, discussing their future projects with MEV boss Stuart Mills.

The aforementioned similarity on their approaches to the build centres on a few key modifications to the basic Exocet package. The main one was the instigation of a tubular centre tunnel in place of the usual more exposed look of the interior. Sticking with the interior, both also wanted to make a full-width dashboard. Both cars achieve a very 'finished' look that's quite in keeping with the Exocet's established style. Perfect integration is the result.

Another similarity is that both builders modified the bodywork of their cars – Chris at the back of the car, John at the front. Chris preferred the rear end styling of the Rocket, and was able to ape that appearance by modifying the rear panel

from a racing Exocet. Its single hump was removed and a mould made to create the bespoke panel you see here. John, meanwhile, wasn't happy with the fit of the bonnet and nosecone, so bonded them together. The single panel now hinges from the front rather than being completely removable.

When we met at Lasham Airfield, it was the first time that the builders had seen each other's cars in the flesh. Although they'd seen photos, this was the first time to really inspect them in detail and compare notes.

Chat was of the differing ride heights (Chris's car runs standard MX-5 coil-overs versus the aftermarket items on John's car) and the optical illusion effect that has on the curve and length of the top rail of the chassis. They were also looking at the different ways in which the interior and engine bay had been finished, which served to prove how many different approaches are possible during a kit car build.

One area in which both cars are identical is in the fit and finish of the aeroscreen. There's a slight lack of symmetry in the body panel, and Chris overcame that by having some chamfered washers specially made that can be rotated to allow the aeroscreen to sit square. Two

The world's most powerful MX-5 is a MEV Exocet

Allan Bowker was tuning and modifying turbocharged cars before he even passed his driving test, so it stood to reason that as soon as he was on the road he was soon in Ford Fiesta and Escort RS Turbos before graduating to RS Cosworths. He's had seven Sierras and five Escorts, not to mention several Subaru Imprezas and Mitsubishi Evos.

However, it was only when he went on to study motorsport academically that he realised he'd been going down the wrong route. "It's much easier to save weight than create power," he says, "so I bought a Mazda MX-5." His appetite for power was still there, though, and the MX-5 was, naturally, turbocharged.

He modified it extensively, but unfortunately it was crashed into whilst parked. While working out what to do with what was left, Allan saw the MEV Exocet at CarFest. Realising it was MX-5 based, he thought it would be the ideal home for the tuned mechanicals from his stricken car. At the time, it had 300bhp. It now has 430bhp, making it the world's most powerful MX-5 engine on regular road fuel. What's more, dropped into the 485kg Exocet, it has a considerably better power to weight ratio than a Bugatti Veyron.

"People say you'd never get the power down," says Allan, "but on boost it just grips and goes like a superbike. It's really easy to drive, too. If it starts under- or oversteering, you know exactly what it's

"It has 430bhp. Dropped into the 485kg Exocet, it has a considerably better power to weight ratio than a Bugatti Veyron"

doing. I do keep in mind that it's a very fast car though – I haven't got comfortable with the performance yet."

Allan hasn't yet recorded any performance figures with the car, but it goes without saying that it's going to be indecently quick. More surprising is what he has to say about its road manners: "As brutal as it looks, it's very comfortable. It doesn't rattle your fillings like a supercar, and you can happily travel long distances in it."

So what goes into making a 1.6-litre MX-5 engine so potent? The roll-call of internal modifications is huge and includes an all-steel crank, Corliss rods, ACL main bearings and rod bearings, custom profile Cat cams and a lot more. The tyres tasked with transferring the power to the road are 245-section Yokohamas, while big 350mm discs with six-pot calipers (front) and 280mm discs and



four-pot calipers (rear) arrest progress.

A new differential is the most recent part of this car's development. "We've been through everything and upgraded it now," says Allan, "so hopefully we're finished now." The plan is to use the car in hillclimb competitions as well as on the road. One thing is for certain: it will generate plenty of attention wherever it goes. In Allan's first week on Instagram, his account (@sexocet) dedicated to the car was gaining 100 followers per day. "I get lots of notifications at night when the States is awake," he says. It seems people are quite interested in insanely powerful kit cars.



Useful contacts (Chris)

Kit: MEV, Mansfield, Nottinghamshire. T: 01623 655522. E: info@mevtd.co.uk W: www.mevtd.co.uk

Various: Car Builder Solutions, Staplehurst, Kent. T: 01580 891309. E: info@carbuildersolutions.com W: www.carbuildersolutions.com

Metal for fabrication: Metal Supermarket, outlets nationwide. T: 0800 012 1576. W: www.metalsupermarkets.co.uk

Powdercoating: Tresten Finishers, Southampton, Hampshire. T: 023 8043 3081. W: www.trestanfinishers.com

Suspension bushes: Freaky Parts. T: 07977 503430. E: sales@freakyparts.co.uk W: www.freakyparts.co.uk

Fibreglass work: JB Fibreglass Developments, Alresford, Hampshire. T: 01962 773665.

Exhaust and wheel alignment: Mike Stokes, Bournemouth, Dorset. T: 01202 547555. E: info@mikestokes.net W: www.mikestokes.co.uk

Engine mapping: Skuzzle Motorsport, Winchester, Hampshire. T: 01962 776167. E: nick@skuzzle.com W: www.skuzzle.com

Useful contacts (John)

Powdercoating: Professional Coatings, Newbury, Berkshire. T: 01635 200017. E: sales@professionalcoatings.co.uk

W: www.professionalcoatings.co.uk

Dampers: Gaz Shocks, Basildon, Essex. T: 01268 724585. E: enquiries@gazshocks.com W: www.gazshocks.com

Carbon fibre: Easy Composites, Stoke-on-Trent, Staffordshire. T: 01782 454499. E: sales@easycomposites.co.uk W: www.easycomposites.co.uk

Fuel tank fabrication and metal for other fabrication: Specialist Welding, Abingdon, Oxfordshire. T: 01235 820821.

Suspension drop links: Flyin' Miata, Colorado, USA. T: +1 970-464-5600. E: sales@flyinmiata.com W: www.flyinmiata.com

matching aeroscreens and set of washers were made so that each car could receive the same treatment. The other neat thing about the fitment is that the aeroscreen sits slightly proud of the bodywork, so it doesn't become a dirt trap.

Of course, a kit car is about more than just the finished result. Along the way, all three builders learnt new skills. For Chris, it was a chance to learn to weld. "I bought a mig welder and practiced on some scraps to begin with," he says. He soon graduated to welding small brackets and the like for the car. John could already weld, and handed that particular skill down to Luke.



The learning curve for this duo was the carbon fibre work. Given the expense of the raw sheets, they soon honed their technique to avoid pinholes and other flaws. The result? Plenty of personalisation for both cars and the satisfaction of adding to the armoury of skills for their builders.

On the safety of the airfield, Chris and John drove each other's cars and, when the photoshoot was over and we sought somewhere to sit for the interviews, Chris threw me the keys to his car. I had a very brief drive on the airfield's perimeter road but it was enough to establish just how sorted the car feels, more or less straight

out of the box. Some of the credit for that has to go to Mazda; so much of the donor's stock hardware and geometry is carried over that the Exocet drives like the lightened MX-5 that it is in spirit. But it also highlights the importance of getting a kit car properly set up.

I said 'more or less straight out the box' because Chris has had the car on a rolling road (Skuzzle Motorsport) and had the geometry professionally set (Mike Stokes Motorsport). So many kit car builders skip these important steps and drive their cars under the illusion that they're already getting the best from them. A proper set-

up is vital for unlocking the full potential.

Part of that unlocking of the car's full potential meant a considered abandonment of the initial budget. Including IVA and registration, Chris's build cost somewhere in the region of £8500 to £9000. John, meanwhile, stopped counting but reckons his build would have cost about the same.

Do they have any plans to upgrade? It's clear that both are happy with the results of their builds, and justifiably so. There is talk about turbocharging both cars, but there's no particular rush to do so. For now, they have two highly individual kit cars to enjoy. ■



Stock Mazda MX-5 engines appear in both cars, but there is talk from both owners of future turbocharging.



Our thanks to Lasham Gliding for use of the airfield photo location. W: www.lashamgliding.com

WHAT WERE THEY THINKING?

Another chance to look back into the archives and wonder at the madness, imagination, ingenuity and occasionally downright brilliance of one-off builders from yesteryear. We salute you!

Words: Ian Stent Pictures: CKC archives

Murray's starter

Everyone has to start somewhere, and for McLaren F1 genius Gordon Murray, what you see here is it. The IGM Minibug ended up going into

limited production, with four eventually built for friends. As the name suggests, the Minibug used a Mini van for its mechanical components, relocated into a



tough spaceframe chassis. "I ended up with buggy sort of thing that was 300lbs lighter than a Mini and bloody good fun," said Murray when interviewed by *Alternative Cars* magazine in 1982.

Remarkably, he bought back one of the original cars recently, after Mini specialist Jeroen Booij discovered it while researching his book, *Maximum Mini*.

Not quite Europa

It's a Lotus Europa, or is it? Appearing in an early issue of *Alternative Cars* and unidentified at the time, there are certainly components nicked from the Lotus, but then it all goes rather strange. The reality is that there are four seats in there and the most likely thought was that instead of Lotus' sporting backbone chassis, this beast was actually running nothing more exotic than Beetle underpinnings.

Hindhead find

This chunky Austin Seven-alike was photographed at the inaugural Southern Kit Car Meeting at Hindhead in Surrey... the first dedicated kit car show. Organised by Peter Filby in 1977, he then snapped this machine, but couldn't find the owner and never saw it again at any subsequent event.

That said, also in our archives

is the picture with the roof down, taken in 1978 at the Kit Nationals. It looks rather better *sans* roof, albeit with a hot rod feel about it.



Invicta Special

Stefan Kukurosovic is the chap in these pics, the then owner of an Invicta based special that he discovered in a barn and brought back to life for these pictures in 1982. The original 1930s Invicta ladder chassis on which the special was based

required significant shortening, while the rear axle was from a Jaguar SS100 as was the original engine for it!

Bodywork was all aluminium and to a very high standard, and Stefan believed that the car was originally built way back in 1946.



Star turn

When spotted by *Kit Cars* magazine in the early 1980s, the rumour had it that this one-off was produced for use in a Pinewood Studios movie where a more sporting version of an MG TF was required.

Either way, the end result was impressive, even if it didn't look terribly convincing as a replica. Underneath the period bodywork was a Triumph TR3a, although front brakes were upgraded to Jaguar items.

Perhaps most impressive is the bodywork, all of which was made in aluminium and, although the front and rear wings are ultra basic in their profile, the end result is surprisingly effective.

Some parts were thought to be of original TF origin, such as the grille surround, windscreen and wire wheels.

We actually have several photos of this car on file, so I wonder whether the ownership of this car was known, but kept secret. Certainly, the wording of the piece is somewhat cryptic.



Automart return

We featured the Automart back in issue 101 but knew little about it at the time. But contributor Richard Heseltine has more information... Heralding from 1971, the car was developed by Lancashire garage owner, John Sharples. The Beetle base included a 1.5-litre engine and Brabham exhaust. It was mentioned briefly in *Hot Car* magazine in 1972, when potential production was hinted at but presumably never materialised.

Adding further intrigue, we've just done a DVLA registration check which confirms that the car (listed as an Automarty) may still exist, apparently now with black bodywork. It may seem a little worrying to sane people, but this is just the sort of news that gets the CKC team very excited. Come on someone, it must be out there somewhere, and we want to see it! You know where to get hold of us if you can throw any more light on this. Make our day!



Work in progress

Whoa! This picture heralds from 1968, where it found its way into an issue of *Hot Car* magazine. Clearly a work in progress, the bodywork is made from a mix of fibreglass, filler and aluminium. I have absolutely no information on this machine at all, and I can't identify the windscreen, which might give a clue as to

the mechanical components underneath this somewhat barking creation. If the rear bodywork is frankly bizarre (albeit unfinished), then the overhang of the front bodywork ahead of the wire wheels also takes your breath away. Did it ever go any further? We may never know, but yet again we take our hats off to the bloke that reckoned this was his dream car. Fantastic.

Peugeot gets hot rod look

In 1980 you could do what you liked with old cars. This is a 1925 Peugeot with its owner Claude Harper, who decided to treat it to some good ol' fashioned hot rod styling. It was spotted at the Hot Rod and Custom Nationals at Thruxton.



Lengthy Lynx

Several pictures of this Moke-style creation were sent into *Kit Cars & Specials* magazine for use in the classified section, when the owner decided to sell it. Simply described as a Lynx Jeep, it was a Mini based one-off with galvanised steel body panels.

Complete with all weather gear, it looks rather longer than



most cars of this ilk and you can't help but think it should have had three rows of seats. It certainly looks well finished and the owner was asking £1000 for it... a pretty hefty price at the time.






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*Typical power increase. Exact increase may differ depending on operational variations.

Track Attack

THIS EVENT HAS BEEN CANCELLED SINCE CKC WENT TO PRINT

The last dedicated kit car event of the year is totalkitcar Live at Brands Hatch on Saturday 21 November.

Although blighted by occasional heavy rain last year, this one-day event still proved a great success and returns for 2015. It's a great opportunity to see kit car manufacturers put their demonstrators through their paces on the famous Brands Hatch tarmac.

Already booked to attend as we go to press are the following companies...

750 Motor Club
AB Performance
AK Sportscars
GBS
Hawk Cars
Kit Car Direct
MEV
Power Torque
RPS Ltd

Sebring International
Speed 3 Automotive
SSC Stylus
Tiger Racing
Veranti Lamberti
Vortex Automotive
Wildmoor MTC
Zenos Cars

If you are considering the build of any of these cars, here's a great opportunity to get yourself into the passenger seat and experience what it can do in the relative safety of circuit conditions.

New for 2015 is the chance to drive your own kit car on the circuit, in full track day conditions, within one of two 15-minute public sessions at 12am and 2pm. You'll need to be quick though, as spaces will be limited. Cost is £30 for a session and you'll find the web link in the contact panel below right.

Alternatively, if you fancy



Expect all sorts of fascinating machinery to be in action on the circuit.

finding out what it feels like to be in a rally car driven competitively, then for £25 you can book Brands' Rally SuperRides experience... three laps around the site's dedicated rally stage.

As well as kit manufacturers on the circuit, kit car clubs are also able to attend, and a number of parts supply companies will also be there (and we'll be there too!). This area has been redeveloped for 2015 and we're expecting it



Lots of manufacturers expected to attend.



Two sessions set aside for private cars.



Why not book yourself a passenger ride?

totalkitcar Live once again returns to Brands Hatch for the final kit car event of the year.



to feel more integrated into the main event. You'll find the CKC stand within the club area, where you can check out a limited supply of back issues, the latest issue and annual Guide, plus a great selection of kit car related books.

Tickets are £10 per adult if bought in advance, or £14 on the day (children under 13 go free) and are booked via the MotorSport Vision (Brands Hatch's owner) website. For all club and stand inquiries, contact totalkitcar using the details below. ■

Show details

THIS EVENT HAS BEEN CANCELLED SINCE CKC WENT TO PRINT

Winter Warmer

A dedicated hall has been set aside for kit car clubs at the Classic Restoration Show over the weekend of 7/8 November. Here's how you and your club can join us.

Around 160 trade stands and 40 clubs have already booked space inside the Classic Restoration Show at the Bath and West Showground near Shepton Mallet in Somerset on the weekend of 7/8 November! It's going to be the perfect weekend to stock up on elusive parts for your project, or simply admire all the classic cars on display... and also the kit cars in a dedicated hall which *Complete Kit Car* has arranged with the organisers.

Add in a car auction, various special displays and a large outside parking area for classic and kit cars, and the event is shaping up nicely as the perfect winter warmer!

This is a great opportunity for clubs and private enthusiasts to come together for a new West Country based event which can take the place of the old Exeter kit car show. So what can you expect?

THE SHOW

As the name suggests, the focus at the Classic Restoration Show is on components and tool suppliers. If you are building, restoring or just servicing your kit car this winter, then there are approximately 160 different stall holders, selling everything from tools, lights, rubber seals and just about anything you can think of!

There is, of course, more to it than just parts. The show area includes a number of exhibition halls, and those not occupied by the trade are jam-packed with classic car clubs, cars for sale and even a car auction!

Outside space is available for private individuals to bring their cars and be a part of the event (a new discounted entry price of only £5 per car and driver has just been announced!). And despite the time of the year, this should prove to be a fascinating place to see all manner of different privately owned classic and kit cars.

KIT CAR CLUBS

CKC has organised for one of the halls to be set aside exclusively for kit car clubs. We're happy to book stands for as few as two cars per club but you need to ensure you can put on a display on both days (different cars can fill the space each day and you can come and go



Around 160 different traders are expected at the Classic Restoration Show.

on each day). Cars on these inside club stands will gain free entry to the event for the car and driver.

This is an opportunity for kit car clubs (and the wider scene) to further integrate itself into the classic car arena... so we need to put on a good show!

To discuss your requirements and register your club's interest, please contact Ian Stent as soon as possible using the contact details in the panel below right.

CLUB CKC MEMBERS

CKC subscribers, under the Club CKC banner, have the chance to join us within the hall if you are not already part of a club which has booked stand space. Please contact CKC to book your space and free entry.



Inside club display cars get in for free.

A GREAT DAY OUT

This is not a traditional kit car show and we are not expecting many kit car manufacturers to attend (although Healy Designs has booked and others are welcome). For clubs, this is a perfect opportunity for you to get together before the winter sets in. For CKC readers it's an ideal opportunity to pick up any vital parts and tools at discounted show prices. Who knows, you may even bag a bargain car in the auction! ■



Display your car outside for just £5 entry.



Show details

The date: 7/8 November, 9.30am-4pm both days.

The venue: Bath and West Showground, Shepton Mallet, Somerset BA4 6QN.

Ticket prices: Adults – £8 in advance, £10 on the day. Under 16s free. Kit car drivers booked as part of an inside club display gain free entry for the driver. Outside display parking available for just £5 per car and driver.

BOOKING INFORMATION...

For advance public tickets contact Bristol Classic Car Shows directly.
W: www.carsandevents.com
For inside club stands: Contact Ian Stent at *Complete Kit Car*. T: 01823 617908.
E: ian@performancepublishing.co.uk

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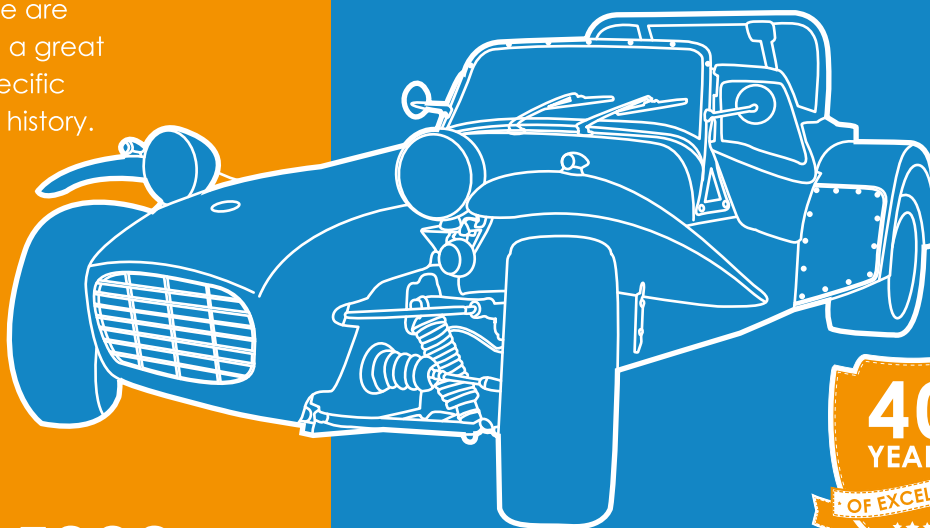
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American TOY

Running Reporter James Shipperley was unhindered by building his DDR Miami GT4 several thousand miles from the factory. In fact, he was the first DDR customer to complete a build anywhere in the world.

Words and pictures: Adam Wilkins



It was James Shipperley's girlfriend, Candice, who had a major influencing factor on which kit car he build, having set the criteria that it would be waterproof and not mess up her hair. Having already assessed the options in *Complete Kit Car* magazine, the obvious choices appeared to either be an Ultima or a body conversion. The Ultima was ruled out for being over budget, while James didn't think that a bodykit would offer the challenge he was looking for. "I've always wanted to build a kit car, and I wanted to learn more about a car mechanically," he says.

The search continued, and he came across the DDR Miami online. Being a new offering, he couldn't find any completed privately built examples, but that didn't put him off. During a holiday in Florida, he made the trip to DDR's factory in Miami to see the car. "It was the worst weather in history, and we spent an hour looking around the car in the rain." Decision made, order placed.

If he feared that a bodykit would be too easy, he'd now gone to the other extreme: a GT car from another country that comes with no build manual must rate on the ambitious end of the first-time kit car builder's scale. His previous experience with working on cars was limited to changing brake pads and spark plugs. If you've been reading about James's progress via his Running Reports, you'll know that he has made quite remarkable progress.

The car was IVA'd and registered within 10 months of the kit arriving. He reckons he spent 650 hours on the build, so that's almost every waking hour of that 10 months when he wasn't at work. It was a fear of the car becoming an abandoned project that spurred him on: "I didn't want to lose momentum." We'd been impressed by James's rate of progress. The quality of the end result is even more impressive.

But let's not get ahead of ourselves. In the three months between ordering the kit and its arrival, James bought and stripped his Toyota MR2 Mk2 donor car, and studied the IVA manual hard. In fact, he had revised it so thoroughly that when he came to the build he only had to refer back to it once; with no other instructions to go by, it became his sole guide to the build.

Being in a different country to the manufacturer, James went into the project well aware that it would be down to him to build the car with minimal factory back-up. "You shouldn't expect back-up, because the regulations in America are nowhere near as strict as the UK's," he says. A prime example of that is the windscreen and Perspex side windows, none of which are E-marked and therefore had to be remanufactured in the UK.

Having gone through that process, having the glass made by Pilkington via National Windscreens, James now has moulds for all the DDR's glass to be made to IVA standard. Not only does that make life easier for future UK builders – and one customer has recently taken delivery of a kit – it also means James can have replacements made if ever he needs them. "I can't thank National Windscreens enough; the car wouldn't be on the road without them."

So, by the time James had binned the windows and headlights (which were for a left-hand-drive car), the kit he had to start with was fairly basic: it comprised the chassis, body and some coolant pipes. With hindsight, James would recommend importing a kit from the USA in the most basic form possible anyway, as you can read in the separate panel elsewhere. And he is full of praise for the parts that came from DDR. "As a chassis and a shell, it went together very easily."

Although it was a challenging project, it was never frustrating: "I never



How to import a kit from the United States

The logistics of bringing the DDR kit to the UK were pretty straightforward. James had to deal with two companies: a USA based organisation to transport the kit from DDR's factory to the UK, and a local company to bring it from the dock to home. For the former, James used Apex Ocean Freight, as recommended on DDR's website. "They arranged everything," says James, "and made it really simple." James had hoped to have the car delivered to Southampton, but the only options from Miami were to Liverpool or London. He chose the latter and the cost to bring it to the UK was around \$2200 (about £1500 at the time).

The company that brought it from the dock to James's home in Dorset was John Good Shipping and charged around £900. It was easier to let them deal with the whole job, otherwise you have a time limit to remove it from the dock before storage charges start to kick in. "Both companies were excellent, and answered all the questions I had," says James.

once got angry with the build, it all bolted together really well – to my own surprise" says James. "Don't get me wrong, there were times when you really need to get stuck in and solve a problem."

And sometimes overcoming those problems were highlights in themselves. "I didn't want to touch the engine initially, so I paid a mechanic change the head gasket and put it all back together. When I came to fire it up, I was really struggling." James went back and double-checked all his own work, and could find no fault with anything he had done, so then started looking into what the mechanic had done. "I took the rocker cover off, and saw that the cams weren't lined up. When I lined them up to what I thought they should be, it fired into life. That's when I realised I can complete the build. It was the defining moment."

The next time James handed over the project to someone else, this time for the paintjob after the IVA test, wasn't easy. "By then, I'd spent so long on the build that I didn't like handing it over to someone

On top of the costs mentioned above, you need to budget for import tax and VAT. A tip James has for anyone importing a kit from the USA is to remove from the order any parts that won't comply with IVA or anything that can easily be sourced locally. Things such as lights, glass and other parts are prime targets. As well as reducing the kit price, it will also reduce the weight (and therefore the cost) of shipping, and the import duty will reduce, too.

Other general advice? "You should go into it with your eyes wide open, knowing that you're on your own. I didn't expect to have any support in terms of IVA compliance, because you can't expect a company in the States to know about regulations in all European countries." So while importing a kit from the USA may be more complicated than sourcing a kit from a UK company, James's project proves that it isn't a hurdle you can't overcome.

else," he says. Giving responsibility for the final look to someone else was a wrench, but he's delighted with the end result. His first choice of colour was a deep metallic red from Mazda, but that's five separate coats and therefore very expensive. The second choice, a Range Rover Evoque hue, is a close call and only three coats.

It contrasts nicely with the hydrodipped carbon fibre effect detailing that's evident on the car. That finish is used for the wheels, front splitter and headlight surrounds, and creates a convincing finish. James has been successful in avoiding the 'kit car' look and creating a production car level of cohesion for the finished car.

The fact that the car has McLaren F1 inspired looks, without trying to be a replica, caused some headaches. "At first people thought it was a bad replica," says James. "In a way, that's a complement because it means it has a look of its own." To combat that, he had a DDR badge laser-cut for the front, and has plans to badge the back of the car too. As the Miami was

never meant to be a replica, so there's no question it should carry its own identity.

The paintshop was very complementary about the finish of the panels. The GRP is thick, and it required very little preparation before paint. The shutlines around the doors are very tight and uniform, although the ones for the engine cover are less so. The paintshop offered James the option of either building up the shutlines with filler, or leaving them as they are. "I decided to leave the shutlines, because I'm sure they can be further adjusted, whereas if a filled panel started to crack you have to live with that." It doesn't detract from the overall look that's been achieved.

Back at the IVA test, one of the failure points was a radius on the top of the door which required sanding down. It was because of that kind of eventuality that James had the foresight to take the car unpainted. Other points included the height of the brake and clutch reservoirs (which you can now see through the top of the front bonnet) and emissions thanks to a failed Lambda sensor. The test itself took eight hours, the extreme thoroughness perhaps because this is the first DDR Miami in the UK. Usually we'd think a four-hour IVA test rather lengthy. However, James found the inspectors at Southampton fair. "They wanted to help me pass, and suggested ways of addressing the failure points," he says.

For balance, registration was quick. "Everyone tells me it's difficult, but I had no problems at all. However, I did pester them!" He wonders whether they had a joke with him when they allocated the registration, as the letters spelt out LOSA, which could be interpreted as 'loser'. "Everyone noticed it," says James, "so I switched to my personal plate ASAP! I took it on the chin, I thought it was very funny."

Because the project has continued since



Tech spec

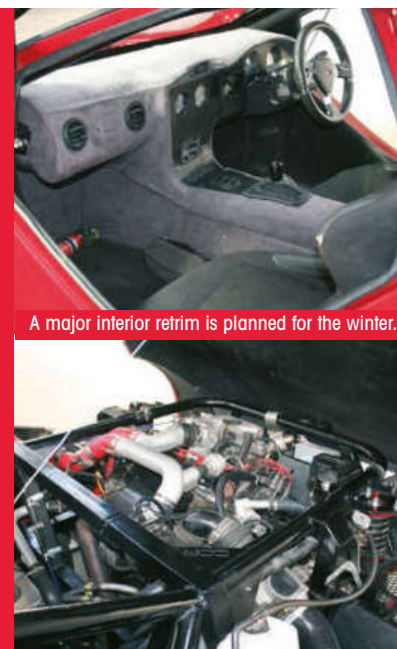
Engine: 2.0-litre turbocharged Toyota MR2 3S-GTE engine, Field ECU, uprated intercooler, air filter, decatted, boost increased to 1bar. Approximately 190bhp.

Brakes: Front – Nissan Skyline 4-pot calipers, 324mm Toyota Supra discs. Rear – Toyota MR2 calipers on custom brackets, 323mm Maza RX-8 discs.

Wheels and tyres: 19in Rota Grid alloys finished in carbon fibre effect hydrodip. Falken 453 tyres in 235/35x19 (front) and 275/35x19 (rear).

Interior: Cobra Monaco S seats, Momo Millennium Evo steering wheel, TV screen for rear-view camera, Dakota Digital dials with own CPU control for additional modules. To be completely retrimmed.

Exterior: Range Rover Firenze metallic paint, carbon fibre effect hydrodipped wheels, headlight surrounds and splitter, LED front sidelights and indicators, 90mm projector headlights, 122mm rear lights, E-Tech mirrors, roof scoop with rally vent.



A major interior retrim is planned for the winter.



Carbon fibre effect for wheels and light surrounds by hydrodipping.



being registered, James's Running Reports have covered the first 1300 or so miles the car has covered. Initial teething problems centred around a failed head gasket (again, the work of the same mechanic we mentioned earlier!), so James stripped the engine and rebuilt it himself. After that, it ran hot but never overheated, so he created some ducting from the front air intake to feed air directly to the radiator which has fixed the issue completely – as you'll know if you've been following the reports.

More recently, the car has taken on longer runs with no problems at all. James is very pleased with how solid the

car feels, with no rattles evident. The body bolts to the chassis in no fewer than 16 places. The only noise that he wants to eradicate is some squeaking from the suspension bushes, which could have done with some more grease. That's a job for the winter. He also wants to replace the LED front indicators with brighter ones, and redesign the back of the car with new lighting. The fitment of a rear wing is currently under debate.

Another job on the to-do list is the much more significant aim of retrimming the interior so that its finish matches the standard of the exterior. That will involve

Useful contacts

Kit: DDR Motorsport, Miami, Florida. T: 954-655-4353.
E: info@ddrmotorsport.com W: www.ddrmotorsport.com

Wheels: Rare Rims, Crediton, Devon. T: 01363 777007.
E: wheels@rarerims.co.uk W: www.rarerims.co.uk

Windscreens: National Windscreens, nationwide.
W: www.nationalwindscreens.co.uk
Pilkington Classics, Sheerness, Kent. T: 0800 848 1351.
W: www.pilkingtonclassics.com

Paint: Hamworthy Bodyshop, Poole, Dorset. T: 01202 632021.
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I built this

Name: James Shipperley

Age: 32

Occupation: IT manager

First car: Ford Fiesta 1.1 Mk2

Fastest car you've been in:
Heavily modified Toyota Supra with 750bhp

Favourite tool in the garage:
Garage floor mats – you can work for much longer with them!

Favourite thing about your car:
The fact it's the first customer-built example on the road

Lottery win car: Koenigsegg One:1

the build of a whole new interior, and the replacement of the current seats. "I'll strip everything from the dashboard, and either flock the whole thing or have some of it hydrodipped," says James. Flocking appeals not only because it won't reflect in the windscreen but also because it's easier to repair than conventional upholstered trim. He's also planning to fit a larger screen to link to the rear view camera. He plans to make a return to Running Reports to cover that job.

As it stands, this car is a remarkable achievement. An enclosed, fully-trimmed GT car is always an ambitious build for a first-timer, and with this car that's compounded by the fact that he had to develop the car alone for IVA compliance

and went without a build manual. Oh, and it's also the first customer-build Miami to be completed. That's quite something.

James enjoys a project more than a finished result so may switch the current MR2 2.0-litre engine for a 3.5-litre Toyota V6. It's a known conversion in MR2 circles, and uses the same mounts and gearbox. The only changes necessary are to the engine management and move to a fly-by-wire throttle, the result would be a step up to 330bhp from the current 190bhp. And looking beyond that, he may embark on a new build altogether. "If and when I ever finish this one, I wouldn't mind doing an open-top car," he says. But that would break the rules about messed up hair. ■



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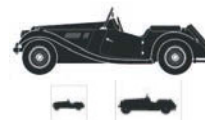
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Fair WEATHER friend



Having built his Locost from scratch, Alan Fosbeary admits to only using it when the sun is shining. Luckily the weather was dry when we met him...

Words and pictures: Adam Wilkins

When Alan Fosbeary was looking to build a car back in the late 1990s, he took a close look at a Robin Hood at a show before concluding that he could build something better himself. He knew nothing of the Locost phenomenon, which was just taking off at that time, but at the same show he stumbled across Ron Champion's *How To Build A Sports Car For As Little As £250* book. "I couldn't believe it gave me a cutting list to build my own chassis," he says. It was decided: he'd build a Locost from scratch.

Fabricating his own chassis didn't prove too challenging for Alan, whose day job involves lots of welding and fabrication. In fact, having cut his chassis tubes to length, he took them into work and had the chassis together in just one weekend. When he started searching for donor parts, he went to a local breakers' yard for Ford Cortina front uprights – and got lucky! The owner of the yard had just given up on building a Caterham, and was selling it off in bits. "I bought the nosecone, and it fitted," he recalls. "From then on, I decided to use as many Caterham parts as possible – that's what we all want, isn't it?"

In fact, so keen was Alan to ape an original Seven that he once visited the Caterham showroom with a camera and tape measure. "I tried to tell them I was seeing if it would fit in my garage, but I was only there for five minutes before I was thrown out." Aside from the stainless steel side panels, which Alan made himself, all the panels are of Caterham origin – albeit modified to fit in some cases. The bonnet, for instance, needed to be widened to suit. The first bonnet Alan bought had a hole in the side for sidedraught Webers, so he sold that one on and bought one with no holes so that he could cut his own hole for the downdraught carburettor on the Ford Crossflow engine that the car was originally fitted with.

The original Locost was based on a Ford Escort Mk2 which, even back then, was starting to become scarce. It was still just





I built this

Name: Alan Fosbeary
Age: 48
Occupation: Site engineer
First car: Ford Cortina Mk4
Fastest car you've been in: Mini 2.0 on track
Favourite tool: Tig welder

Above: Alan's Locost with father Eric's NG TC. **Above right:** Alan Fosbeary built his Locost several years ago. **Below left:** Foz 500 branding on the Locost combines Alan's nickname with Caterham R500 inspired figure. **Below:** Caterham tonneau widened to suit.



Above: Caterham CSR inspired dashboard was a recent modification. **Below:** Most bodywork is of Caterham origin, some modified.



about viable as a donor though – having phoned around all the breakers' yards in Kent, Alan eventually had a lead to one that he bought for £50. That would be unthinkable now! The donor had an MoT and just 42,000 miles on the clock – but it was rotten. "I could put my foot on the front wheel from the driver's seat," says Alan. Once the Ford was harvested, the remains were weighed in for scrap and Alan received £20 for what was left of it.

As the build progressed, so Alan further deviated from the book's instructions. "There were some mistakes in the first edition of the book," says Alan, "but you could work around it." He was encouraged by a feature in *Which Kit?* magazine on Steve Mullanny's Locost, which was completed just as he set out on his build. Seeing that someone else had completed a build was a great spur, and Alan met Steve (and saw his car) for the first time at this year's Classic, Kit & Retro Action Day at Castle Combe.

As well as creating as close to a

LOOK

Alan Fosbeary used as many genuine Caterham body panels and other parts as possible in the creation of his Locost.



Caterham as possible with the exterior, it's a theme that continued inside the car. Alan got hold of some original Caterham seat frames and made his own to the same design. The interior has been upgraded since, as part of a big overhaul back in 2008.

The car was originally on the road in 2003. SVA, as it was in those days, was a relatively straightforward affair save for one issue. Because Alan had filled in the form stating that the car weighed 1000kg, the brake test was performed to that specification. As it was, the brakes worked sufficiently for its genuine 750kg weight, but because the paperwork was wrong it failed. Once that was sorted, it passed – and the car was subsequently registered with an age-related plate. It's badged Foz 500, the former part being Alan's nickname, the latter a nod to the Caterham R500.

The 2008 upgrade saw it taken off the road for four major changes: the Ford Crossflow was swapped for a 1.8-litre

Zetec engine, the brakes were upgraded to Wilwood items, the four-speed gearbox was swapped for a five-speed and a bespoke dashboard was created to replicate that of a Caterham CSR. "As soon as I saw the CSR, I knew that was what I wanted to do with my interior," says Alan.

He was able to bend the tubes to shape and make a jig at work, but that did make the trial-and-error process rather long-winded – bringing each part home to check it against the car and then taking it back to work to tweak it took several days. The artificial carbonfibre inserts are attached to tabs, and Alan chose VDO instruments because that's what Caterhams come with. Previously, the car had used a Ford Capri instrument binnacle so this was a real step up. It looks very neat.

An easier task was fitting the Wilwood brakes, which also involved the fitment of a new pedal box. Alan wanted to move to floor-mounted pedals from the donor-sourced pendulum pedals, and

Tech spec

Engine: 1.8-litre Ford Zetec, Suzuki GSXR 1000 carburettors, Megajolt management, Vernier cam pulleys.

Gearbox: Ford Type-9 5-speed.

Suspension: Front – Double wishbones, coil-over dampers. Rear – Ford Escort live axle.

Wheels and tyres: Sparco 15in alloys, Yokohama tyres.

Brakes: Wilwood four-piston calipers and discs all-round.

Interior: Caterham CSR style dashboard, VDO instruments, modified Caterham seats, floor-mounted pedals.

Exterior: Caterham nose, grille and wings, modified Caterham bonnet, stainless steel side panels, half hood, hood bag, modified Caterham boot tonneau.

fabricated the pedal box himself. "I have a thing about not buying anything I can make myself," he says. Even if that means taking measurements from commercially-available components, he'd rather put something together himself. "The pedal box was much easier to make than the dashboard," says Alan. "It was a self-contained job."

The reason the Crossflow was changed to a Zetec was because the former had caught fire. It was enough to burn the paint on the bonnet, necessitating a localised respray, and for Alan to decide upon a more modern engine installation. He bought the 1800cc engine unseen from a friend, trusting that it would run. It didn't. One of the cylinder bores was filling with oil so the engine wouldn't turn over. He took the engine back out, stripped it and replaced the shells and it has run well ever since. In league with the Suzuki GSXR1000 carburettors, it produces 150bhp. "I don't think I'd want any more



power,” says Alan.

Since the car has been on the road, Alan has only ever used it in the dry. As a result, it only covers about 2000 miles per year but, even several years into ownership, he clearly still gets a real kick from driving it. It's used for trips to shows, local runs out and he used to often do the school run with it. Since building the Locost, Alan has inspired his father Eric to take up the kit car hobby. Having never before had an interest in cars, he has now owned several NGs. We've often heard of sons inheriting the petrolhead bug from their fathers. This could be the first time we've heard it in reverse.

It remains an on-going project. After several years on the road, he has become very wary of the fact that the wishbones

are made from stainless steel. As a material, it's prone to cracking and not recommended for load-bearing parts – so they're likely to be remade. He is fond of using stainless steel, though, opting for that material as much as possible throughout the build. The water pipes, expansion tank, oil catch tank and battery box are all made from the stuff. “I can't help myself,” says Alan.

Other future modifications? Alan is also considering making a rear diffuser for the car. “I've never worked with fibreglass before, so it would be good to learn how to do that.” A longer first gear is on the wishlist, too.

And the car has always been a rolling project. Recently, Alan made a half hood for the car, similar to the kind offered by Soft Bits for Sevens. It wasn't the first

Useful contacts

Brakes: Rally Design, Swalecliffe, Kent.
T: 01227 792792. W: www.rallydesign.co.uk

Powdercoating: BP Blasting and Coatings, Sittingbourne, Kent. T: 01795 844848.
E: info@bpblasting.co.uk
W: www.bpblasting.co.uk

Various: Car Builder Solutions, Staplehurst, Kent. T: 01580 891309. E: info@carbuildersolutions.com
W: www.carbuildersolutions.com

Hood bag: Soft Bits For Sevens, Pulborough, West Sussex. T: 01798 817560. E: juddltd@gmail.com W: www.softbitsforsevens.co.uk

It's for sale: Alan is now planning to scratch build an exoskeletal car, so the Locost is for sale.
E: fizzie500@googlemail.com

upholstery he'd been involved with: a genuine Caterham boot tonneau was modified to make it wide enough for the Locost. It proves that, although the Caterham nose fitted, the Locost gets wider than a Seven at the back. Lift the tonneau and you'll find a washing-up bowl acting as a boot space. “It's ridiculous really, but so useful!”

Therein lies the appeal of a scratch-built car. While Alan has adhered to replication as much as possible, there's still space for personal improvisation. We wonder if Caterham will adopt his luggage space idea... ■



Your Letters

Got something you need to share with the kit car world? Need to let off steam about the kit car scene? Here's your chance to have your say – email us, and spread the word via this page.



3D illusions

I saw Tribute Automotive's Kobra in the flesh at Stoneleigh in 2014 and didn't truly like it. I found the lines were not fluent, something struck me, I don't know what, but it didn't seem right! As far as I can see on the pictures, the Kalifornia from the same manufacturer looks very, very good. It is a car I would like to own but I certainly wouldn't badge it as a Ferrari! It not only reminds me of the legendary Ferrari 250 SWB or GTO, but also of some early Maseratis.

The demonstrator looks the part and I wouldn't change anything, not even in the interior. I hope they will find a solution for the fiddly inside hinges for the boot. It would be a pity to fit exterior ones, the shape of the back looks so perfect now!

I would simply badge it as a TA Kalifornia. I think nobody would guess it's a converted BMW Z3, that's the fun! In the same way, I wouldn't badge the Martin & Walker 356 replica as a Porsche, although it has a Porsche engine and a very convincing 356 replica body. It's also a car I like very much but I wouldn't go for the 'outlaw' style inside, I would make it more comfortable.

This summer I participated in an event called 3D-World Magic

& Fun in Koksijde. We display 50 painted decors in a Culture Centre in which the visitors can photograph their family. On the pictures, it looks like you are really in the scene. This year we had for the first time a 3D printing company that made figurines of (paying) visitors from a scan. It was very interesting to see how they did it, and how the sculptures were built up layer by layer.

Antoine Ryckman, Belgium

Incy wincy Spyder

I have had a Midtec Spyder on the road for over 12 years and have

now struck a problem which your readers may be able to help me with. The bushes in the damper units are starting to break up. Does anyone know the original supplier of these dampers so that I can purchase some replacements? If not, I can take the units off the car and measure them up but this means having the car immobile.

Reading the article on the Midtec build in Running Reports reminds me of the 'fun' had by the first people to buy the kit, which, at the time, inspired me to write two articles entitled "Things My Mother Never Told Me About Midtec Building."

Issues included heating up the gearchange lever on the gearbox to change its profile. The heat transfer often destroyed a nylon

spacer inside the gearbox and ruined the gearchange quality.

It is good to see that there are more in existence and still running. Mine is continually being modified – not always producing an improvement.

John Speed, via email

Is there no identification on the damper units themselves? What colour are they? I would guess they are either Spax or Avo. Both are largely the same and I suspect if you measured the internal dimension of the bush housing and the diameter of the bolt then I've a sneaking suspicion that either Avo or someone like Protech can easily supply you with replacements – Ian.



Letter of the month

Letter of the month wins its writer a top quality CKC fleece

Great or fake?

I was with interest I read your comment in September's CKC, about the Nubodi Automotive's 250 SWB Kalifornia being badged as a Ferrari when it clearly is not. This is a subject I feel very strongly about.

I can fully understand why people want or even crave for the exotic replica kits, and maybe they want to fool the general public into thinking they are driving something that it is not, but it doesn't fool people in the know.

Many of the manufacturers

of these kits, whether body kit or full build, go to great lengths to achieve such a high quality of fit and finish to their product, only for the owners to give all the credit to a mainstream manufacturer by sticking their badges on it. This practice also instantly devaluing its credibility as a fake or forgery.

I think there's also a bit of fun in keeping 'em guessing. It has a lot more appeal to me for someone to ask, "what is it and did you build it", rather than, "that's not a real thing," and then have to explain why not and what it really is.

The likes of Nubodi, DNA, AK etc are well engineered and of a quality that some mainstream manufacturers



would be proud of, so surely they deserve their own badge on their own product.

Just my opinion.

Keith Saunders, via email

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Reader's GD build

Find out how Paul Banks put together
his Gardner Douglas GD427

Toyota 1KR-FE

Will this three-pot become a kit car
force to be reckoned with?



Brakes

Ed Morton on one of the most (the
most?) important parts of any car



Running Reports

The latest from our reporters'
garages at home



GD 427

Paul Banks had never built a kit car before, and then set about creating an immaculate GD 427 Cobra replica. Ian Stent found out how he did it.



Like so many of us of a certain age, our early memories of kit cars focused largely on the products of one company... Dutton. And the 18-year-old Paul Banks had more reason than most to take an interest in its affordable products... he lived just down the road from the factory. And while thousands of us bought into the dream of building a kit car, Paul never quite managed to make the leap of faith.

Roll forward three decades and he found himself ready for a new



Above: Paul Banks had never built a kit car before and looked forward to the build process as much as the finished car.

challenge. Perhaps now was the right time for a kit car project? Still living in the South East, Caterham Cars wasn't far, but at 6ft 4in tall and with size 12 feet, there was no way he was going to be able to get comfortable. Kit car magazines became a renewed interest, and the Cobra replica scene hove into view. Paul did thorough research on the market, considering virtually all of the obvious options. Three cars eventually rose to the top of the pile as potential contenders... AK Sportscars, Dax Cars and Gardner Douglas Sports Cars.

Clearly, ensuring that he could get comfortable was a key factor in his choice, and visits to second-hand Cobra specialists Sovereign Cars and Total Headturners enabled him to jump in multiple examples. A Dax open day at the factory was also useful, but despite fitting in the car he just couldn't get comfortable.

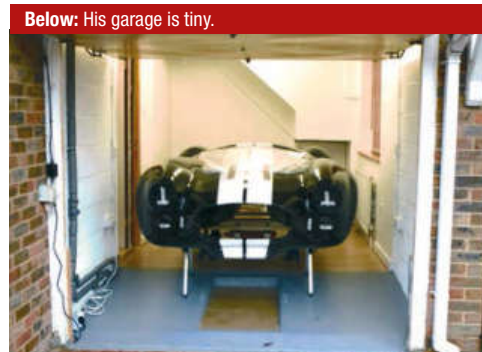
Another early requirement with any build that he contemplated was the ability of the company to pre-fit a number of components to the chassis. Paul's single garage is one of the smallest we've come across,



Below: Paul tries a GD427 for size at the factory.



Below: Collecting his bodyshell a few months later.



Below: His garage is tiny.



Above: All hole positions are pre-marked and sizes noted.



Above: Paul opted to remove the flashlines himself.



Above: Flashlines are small ridges formed where two parts of the body mould are bolted together.



Above: Stanley blade used to scrape off initial ridge...



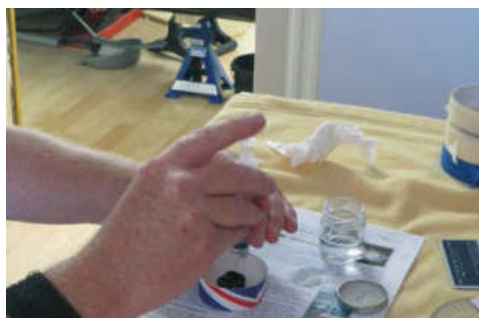
Above: ...which leaves this seam remaining.



Above: Fine abrasive paper takes off the rest.



Above: Where inner and outer panels are joined, imperfections in the gelcoat need filling...



Above: ...Paul mixing up some new gelcoat...



Above: ...which can be painted into the offending areas.

for any kit car project... so building a relatively large Cobra replica was always going to be challenging.

For various reasons Paul increasingly found himself coming back to Gardner Douglas. On a visit to the 2012 Donington kit car show he had a list of yet more questions for the company's Andy Burrows. When they were answered with now familiar clarity and assurance, Paul found his decision made for him... he placed an order shortly after the show.

Gardner Douglas is unusual in offering two different chassis

options, one based around familiar Jaguar XJ6 donor parts and the other using new parts throughout (the Euro option). With Paul's limited space at home, he didn't fancy refurbishing old Jaguar bits, and GD had always offered the Euro as a rolling chassis option from the very first moment it developed the model.

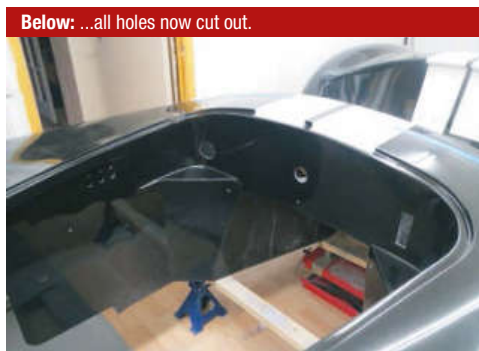
In contrast to almost all other kit cars, because of the GD 427's semi monocoque bodyshell, the factory recommends builders order the body first and get that largely complete, before ordering the

chassis. It meant an early decision on colour, as GD has always offered its car in a coloured gelcoat finish. The traditional blue with white stripes was the one thing Paul wanted to avoid, and he's always been a big fan of black cars. GD is also unusual in being able to put the white stripes actually into the gelcoat finish, so Paul opted for double white stripes.

Regardless of the surface quality achieved by GD with its fibreglass bodies, when the shell is removed from the mould, it still has the raised flashlines where the sections of the



Below: Engine bay bulkhead marked by the factory...



Below: ...all holes now cut out.



Below: Oil-cooler vent needs cutting out...



Above: Removed section used later as a former for the grille



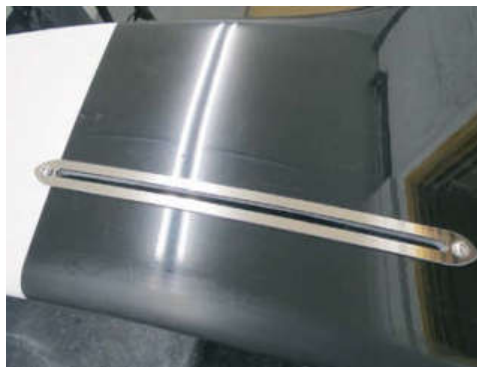
Above: Headlights going in. Masking tape helps when marking up and avoiding scratches or chips in the gelcoat.



Above: Chain drilling the narrow holes for the demist vents.



Above: Vents now cut out and ready for...



Above: ...polished cover trim.



Above: Door inner frame, hinges and latches in place.

mould are bolted together. While the factory offers a service where it can remove the flashlines and polish the whole bodysell, because Paul had already been forced to opt for a rolling chassis (for practicality reasons with his very small garage), he was keen to do as much of the remaining work himself as was possible.

Removing the flashlines and filling with coloured gel small areas where double skinned panels are bonded together (such as doors, bootlid and bonnet) was a job that took many months of painstaking work. And it was an exercise in appreciating the

skill and expertise of the laminators who do this work on an almost daily basis. His choice of black didn't help in this process, as it shows every and any imperfection. The end result he has achieved is fantastic.

In addition to removing the flashlines, Paul also had to drill a number of holes into the shell for lights, windscreen, wiring and other items. Each position was already marked in the shell by the factory, with the centre point pre-marked, along with masking tape alongside each one with the hole size marked in pen.

And then there was the job of hingeing and gapping the doors, bonnet and boot. The hinges were all supplied in bare metal and Paul was meticulous in locating the panels and ensuring the alignment was perfect. Once he was happy with the result, all the metalwork was sent off to a local powdercoating company, Greenhill Finishers in Littlehampton, West Sussex, for finishing in black prior to refitment. Just over a year after starting the process, Paul was ready for the rolling chassis to arrive!

While much of the Euro chassis specification is set by the factory,



Below: Much time spent getting the alignment spot on.



Below: View of the mechanism from inside the car.



Below: Paul sets about aligning the bootlid.



Below: Cardboard chocks help to get the panel gaps even.



Below: Checking alignment of the inner hinges.



Below: Drilling out the release lever holes in the bonnet.



Above: Undersealing the bodyshell. Then painted black again.



Above: The rolling chassis arrives from GD.



Above: Paul lifted the body to allow it to fit underneath.



Above: Paul checks over everything before the body fitment.



Above: Using a plumb line to align hole in centre tunnel with the gear lever...



Above: ...using Dremel hole cutting tool.

there are still some big decisions to be made, such as engine, gearbox and exhaust. Key to Paul's motivation with this project was the desire to use the end result as often as possible, and in particular for longer journeys abroad. That meant reliability and refinement were high up the priority list. So while the old-school look of a carburettor-topped Chevy 350cu in V8 appealed, everything else (including a ride out in an LS engine factory demo car) told him to go modern injection. So a largely stock LS3 V8 it was. A 6-speed Magnum T56 gearbox would also maximise

touring refinement, so that went on the spec sheet too. Finally, there was the decision on what sort of exhaust system. While GDs tend to feature underslung systems, the factory can offer a more traditional side exit exhaust. The latter would have looked fab with his aggressive black and white body, but in the end practicality won the day, with the reduced noise and no risk of leg burns meaning an underslung system was ticked on the order form.

With his tiny garage space it was vital that chassis and bodyshell were united as quickly as possible. Paul

lifted the shell high enough so that the chassis could be rolled underneath and he could check alignment and then drill the holes for items such as the gear lever where it passes through the top of the centre tunnel.

Finally ready for the lift onto the chassis, he called on family, friends and neighbours. The chassis was rolled onto the drive and the shell then carried out and located onto the GD's unique backbone frame. It was lifted on just the once, and within 10 minutes that was it! Final tweaking of the alignment of the shell was done in situ, before Paul could finally bolt it

Below: Four people needed to lift the body onto the chassis.



Below: Body fitted in ten minutes...



Below: ...aligning bolt holes took longer.



Below: Locating the windscreen an early job.



Below: Various items now fitted to engine bulkhead.



Below: Bootlid catch now in place.





Above: String lines help position fog and reverse lights.



Above: Rear lights now complete.



Above: IVA spec filler has inner cap and lock...



Above: ...which is hidden when traditional cap is in place.



Above: Paul drills out the holes for the roll hoops...



Above: ...you don't want to get these wrong!

Useful contacts

Kit: Gardner Douglas Sportscars, Newark, Nottinghamshire. T: 01949 843299.
E: sales@gdcars.com W: www.gdcars.com

ECU/engine set-up: Canems, Scunthorpe, North Yorkshire. T: 01724 700222.
E: sales@canems.co.uk W: www.canems.co.uk

Electrical parts: Auto Electric Supplies, Tenbury Wells, Worcestershire.
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Powdercoating: Greenhill Finishers, Littlehampton, West Sussex.
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Fasteners: Westfield Fasteners, Aylesbury, Buckinghamshire.
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W: www.westfieldfasteners.co.uk

Silicon hoses: SFS Performance, Luton, Bedfordshire. T: 01582 509250.
E: sales@sfsperformance.co.uk W: www.sfsperformance.co.uk

down. Job done.

While the chassis was largely complete from the factory, there were still mechanical components that needed locating into the shell. The fuel tank fits in the boot area, while the steering column obviously passes through the fibreglass bulkhead up front and is located onto a steel substructure under the scuttle.

Another early job was the alignment and location of the windscreen, and drilling through and locating the twin roll hoops. Both jobs required copious measurement and nervous moments when drilling the

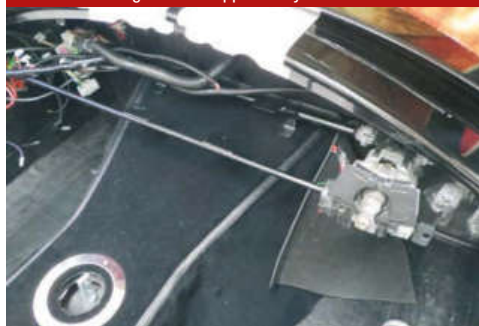
required holes became inevitable.

GD offers two different dash styles, one with a flat underside aping the original Cobra, and another which features a centre console area dropping down to meet the centre tunnel top. Purely through personal preference, Paul went for the latter. Although he could have located the gauges wherever he wanted, he followed the established route and, once again, the centre points for each gauge were pre-marked by the factory in the flat fibreglass panel. Where he did deviate from the norm was in the location of

Below: Hoop in place and holes perfect.



Below: Steering column supported by steel crossbar.



Below: Trim kit supplied by GD. Paul took time fitting it.



Below: Centre tunnel and rear bulkhead in place.



Below: Trial fitting dash panel with gauges in place.



Below: Back off the car and ready for trim...

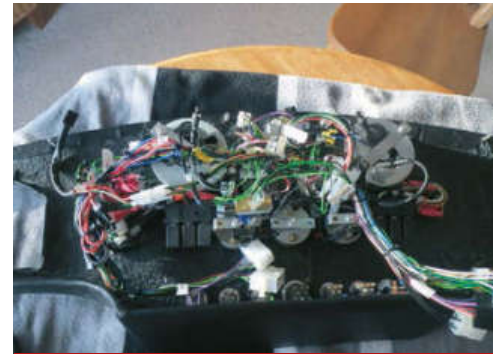




Above: ...foam padding stuck down and holes cut out...



Above: ...leather over the top and holes to cut...



Above: Lots of gauges and switches means lots of wiring!



Above: Back in the car. It's coming together now.



Above: Seats made specifically to give Paul more space.



Above: Grilles for the front vents...

modern Savage style switches, which he located across the centre console area. Opting for white faced gauges also helped to lighten the interior trim and connect with the black and white exterior livery.

For the carpet and leather trim, there were more decisions to be made, and Paul spent a lot of time considering his options, from main colours to contrasting piping on the seats. In the end, an all black livery was chosen. Understated, yet purposeful. Fitting it was another painstaking job that Paul was determined should be perfect.

With the car almost complete, Paul still hadn't yet started the engine. But with all the wiring in place, the fuel and oil systems charged there was no further delay. He connected up the Canem's ECU, turned the ignition... and the LS3 V8 fired first time. No drama, no fuss. And his experience of Canem's service would be further enhanced once the car was on the road. More on that in the next issue.

When it came to IVA, Paul was keen to have Gardner Douglas check the car and then take it through the process. So it was trailered up to the factory and then in June of this year

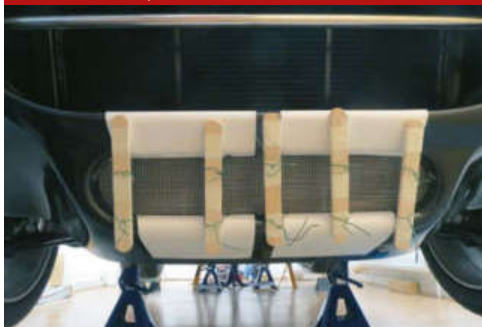
put in for its inspection... it passed first time. Registration on a new plate took a few weeks but was drama free... the car could officially be driven on the road for the first time... in fact, that would be the first time Paul had ever driven a Cobra replica of any sort! Would it meet his expectations?

You'll have to wait for part two of the story, in next month's issue. ■

DON'T MISS PART TWO

in the December 2015 issue.
On sale from Friday 13 November

Below: ...held in place while sealant sets.



Below: Engine bay largely complete.



Below: Paul's GD 427 almost ready for its IVA. Don't miss the next issue of CKC to see the finished car.





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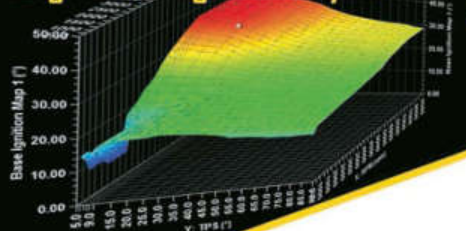
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Our Cars

James's Nova has been for paint... but he's not telling anyone what colour it is! Meanwhile, John's UVA Fugitive is looking forward to some wider wheels as one of its winter upgrades and Stent's Cyclone has received a visit from an auto electrician.



James Horsley

PROJECTS

Apal buggy and Nova

THIS MONTH

The Nova receives a coat of paint – but the colour remains a secret until the big reveal!

Deadlines. They have been the recurring theme of the last month. After a soaking on the way back from CarFest, the buggy has been slowly drying out in the garage. I have made the decision to get a roof made up soon to make it slightly more practical, but that is going to have to wait a month or so while I focus on all things Nova.

As I mentioned last month, the aim had been to get the Nova in one colour by early September. I wasn't focussed on a show-winning paint job at this stage – just covering the repairs and getting it to one colour ahead of engine fitting and road testing. Speaking to a few paintshops soon ruled out my idea to just blow it over in primer. The advice was that, even with a GRP shell, the porous nature of primer would allow water to penetrate the shell and cause issues with paint down the line.

So the decision was made to paint

up in the potential final colour and then do final touch ups, canopy and full laquer and polish next year. I had set a date for the engine fitting, so needed to work back from there.

Massive thanks to Jamie at Prestige Paintworx, just a couple of

miles from home in Worthing. Jamie agreed a price for the initial paint now, and final detail in 2016 and astoundingly turned the shell and panels around in one week.

With a date for the paint set, I had to continue my panel fitting

Below: Nova bodyshell being prepared for paint. James found a paintshop a couple of miles from home.



and complete as many jobs that had potential to damage the paint if they were left until later! I struck lucky and found a useful local welder near my office in Horsham – Neil Dunne Welding. Again, Neil has to be thanked for turning around some pieces very quickly to my rather dubious plans, including the steering column support frame.

With this frame made and designed to allow the dash to slot over it, I was able to test fit the dashboard and the canopy. The interface between the Nova Mk1 dash and the canopy is snug, and needs to be right. I also needed to get this spot-on to know where Jamie would need to paint down to inside the tub.

Once this was bolted in and tested successfully, I had little time to stand back and admire a nearly complete Nova. It was spanners out again and strip down prior to paint. Once the car was split and parts lined up, it was quite shocking at how much space it took up. Thank you Sarah for letting the dining room become an overflow parts area!

I think Jamie was surprised, too, when the panels were dropped off to the paintshop and ended up filling his prep area completely! I finally settled on a colour choice the night before paint – and this time stuck to my plan, and the colour my first Nova was supposed to be! I was a bit mean though and kept the colour choice a secret from Sarah until we went to collect the painted panels. You will have to wait, too!

When I collected the painted



Above: Steering support frame was welded up by a specialist near James's work. Quick turnaround!



Above: Dining room became a Nova parts storage area. Amazing how many panels there are!



Above: Post paintjob, James only supplied a black and white image. Colour a secret for now!



Above: Rear window template being made – and needs to be adjusted to suit rubber trim.

panels, they were of course even harder to store with fear of scratches consuming me. Even though I know the car will be back into the paintshop next year, I was determined to avoid any silly damage. The front and rear bumpers were refitted immediately as were the headlight pods and bonnet. Seats and dash were the final additions and suddenly the car was looking the part – and the dining room was restored!

The rear window tunnel has been fitted for now, but I still need a rear glass window. Previously, I have used Perspex for this, but I have decided to get toughened glass panels made to my template. I sourced a suitable rubber, and then had to reduce the

size of my outer template to allow for the rubber thickness. You can't trim or adjust glass once toughened so I need this to be right! The rear window tunnel conventionally is glazed on the inside, and then 'pokes' through the rear bodywork. This has always struck me as a compromise, so on this car I am glazing the inner panel, and fitting an outer glass that will be flush with the bodywork. Hopefully this will look more production like, and help with noise insulation as well.

So what's next? Well, the final deadline was the date to take the car to the engine fitters, and hopefully a little nearer to road legal. More of that next month.



John Dickens

PROJECT
UVA Fugitive

THIS MONTH
John has been gathering parts for this winter's upgrades.



Last year, when I wheeled the fully assembled UVA out of the garage for the first time, it quickly became apparent that the 6in wide Wolfrace wheels with 205/60 by 15in tyres were too narrow for the rear arches. As a temporary measure, I fitted spacers to the rear hubs which made the problem less obvious but was never meant to be a permanent cure.

I resigned myself to having to get a set of steel wheels banded to the required sizes and, in fact, went so far as to buy a full set of standard VW wheels in preparation. At the same time, though, I kept an eye out on eBay and the specialist VW forums and eventually it paid off. A couple of weeks ago, a pair of period 7in by 15in Wolfrace wheels turned up for sale, so I grabbed them.

They even have the strange raised ridge just inside the outer rim. This

feature has caused quite a lot of comment at shows. The ridge is not so pronounced on the wider rims though as this is where all the extra width is located. These rims were ideal for the 235/60 by 15in tyres which are the widest readily available at a reasonable price.

This combination, while not filling the arches completely, will certainly not look as puny as the current fitment. The

Below: John found some wider Wolfrace wheels.



new wheels will need a couple of small kerb marks tidying up then they will be powdercoated to match the current wheels. I'll take them to We Fix Alloys, the company that made such a good job of the wheels the last time.

On an unrelated but still automotive note, I am busy sorting out my 1974 Honda 350 Four. With only 87cc in each cylinder, the power unit is a fascinating exercise

Below: They'll soon be recon'd like his old ones.



in miniature engineering. The four 22mm carburettors, as well as being incredibly compact, have a complex but brilliantly efficient linkage system keeping the whole system synchronised.

This summer has been one of the poorest I can remember, so when we do get the odd sunny day I try to make the most of it. The first Sunday in September was a glorious day so, after the F1 from Monza, I took the UVA out for a drive. I had no destination in mind initially but there are some very nice driving roads around the area and I eventually ended up at Hartside Top Cafe just outside Alston. This is a well known bikers venue in the North East so I was hoping to see some interesting machinery. Sadly, there was absolutely nothing worthy of note and the UVA was by far the most interesting vehicle there.

The twisty ascents and descents did give me a chance to give the car a good workout though. It turns out that although the steering is a bit vague on motorways it tightens up beautifully in fast bends. The car really digs in and corners well. Having the centre of gravity set so low must be a major factor. There is very little body roll even



Above: Working on his 1974 Honda motorcycle is a lesson in miniature engineering for John.

though I am not using the standard Beetle front anti-roll bar or the rear Z-bar. Although the brakes lack the initial bite and light pedal pressure of a modern servo assisted system they do stop the car well if you press hard and, with such a light car, there is no fade even on long fast descents.

In a month or so, the open car

driving season will be coming to a close so I'll have to make good on my promises and start to pull off the carburettors and fit the Megajet controlled fuel injection system. I hope Ash, now in America, is ready for an awful lot of technical questions by email. Still, it was always meant to be a learning experience.



Ian Stent

PROJECT
CC Cyclone

THIS MONTH
Wiring the new front and rear lights.

As always, it's frustrating how time flies by with little or no progress on the car front. The front and rear lights on the Cyclone have lacked power ever since they were installed, with the disgraceful reality being that there is an automotive electrician within the very same group of units as CKC headquarters!

That situation has thankfully been rectified after I dropped into Konnect Auto Electrical (01823 333404) and spoke to main man Pete Kellow. He was relieved when I pointed out that I'd already hunted out the multipin connectors (from a breakers yard over a year ago) for the new 405 rear lights on the back of the Cyclone. Without them, the job would have been far trickier.

Pete took the car away for a day and soon had both front and rear lights all working. The rear lights look absolutely stunning and once again confirm that my months of searching for alternative

units to the Cyclone's original Vauxhall lamps was well worthwhile. Only problem was the new LED front indicators, where the low voltage means the indicators flick on and off too fast. Car Builder Solutions sells the necessary resistors, which are now with the car and awaiting Pete to drop into the CKC unit and do a quick update. All told, another little step towards getting back on the road.

And getting back on the road is very much my focus at the moment – yes, I know I may have said that before! I've been longing to use the car all through the summer and my gut feeling now is to hold off doing the proposed engine swap to Saab turbo and just get the damaged bodywork repaired and repainted by Auto Mirage. In a year or two, I can then look to an

engine upgrade if I still feel the need.

Only slight hiccup in the plan is the new front headlight pods. While moving the car around outside the unit I've had a chance to drive up a curb and compress the suspension on one side... under load the end of the upper wishbone can impact on the underside of the light pod... my worst fear. It's a complete pain and means some form of mod to the excellent pods designed by Andy Westgate of Westgate Composites. It may be that some minor cutting away will do the trick, but I've a horrible feeling it may need rather more radical surgery. Frustrating... and yet another delay in the car returning to the highway. ■

Below: Stent's delighted to see the lights working.



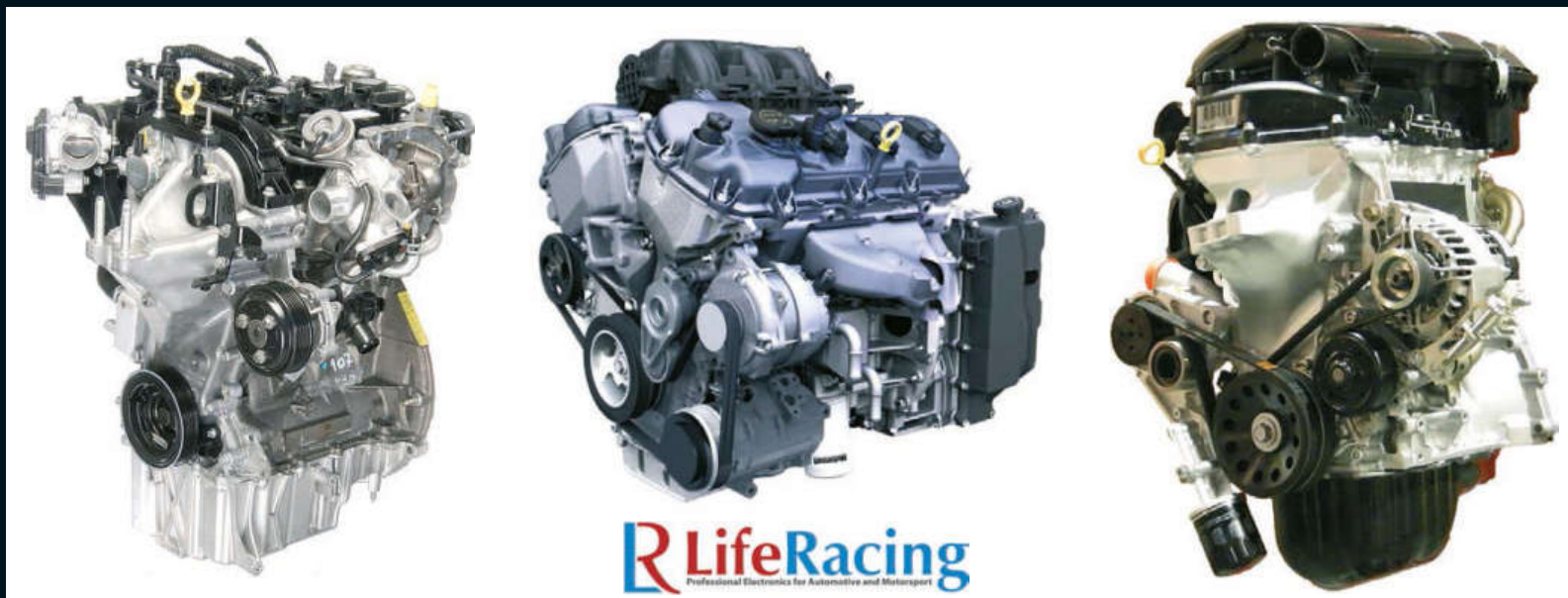
Below: Konnect's Pete Kellow sorts the wiring.



Below: Resistors needed for the LED indicators

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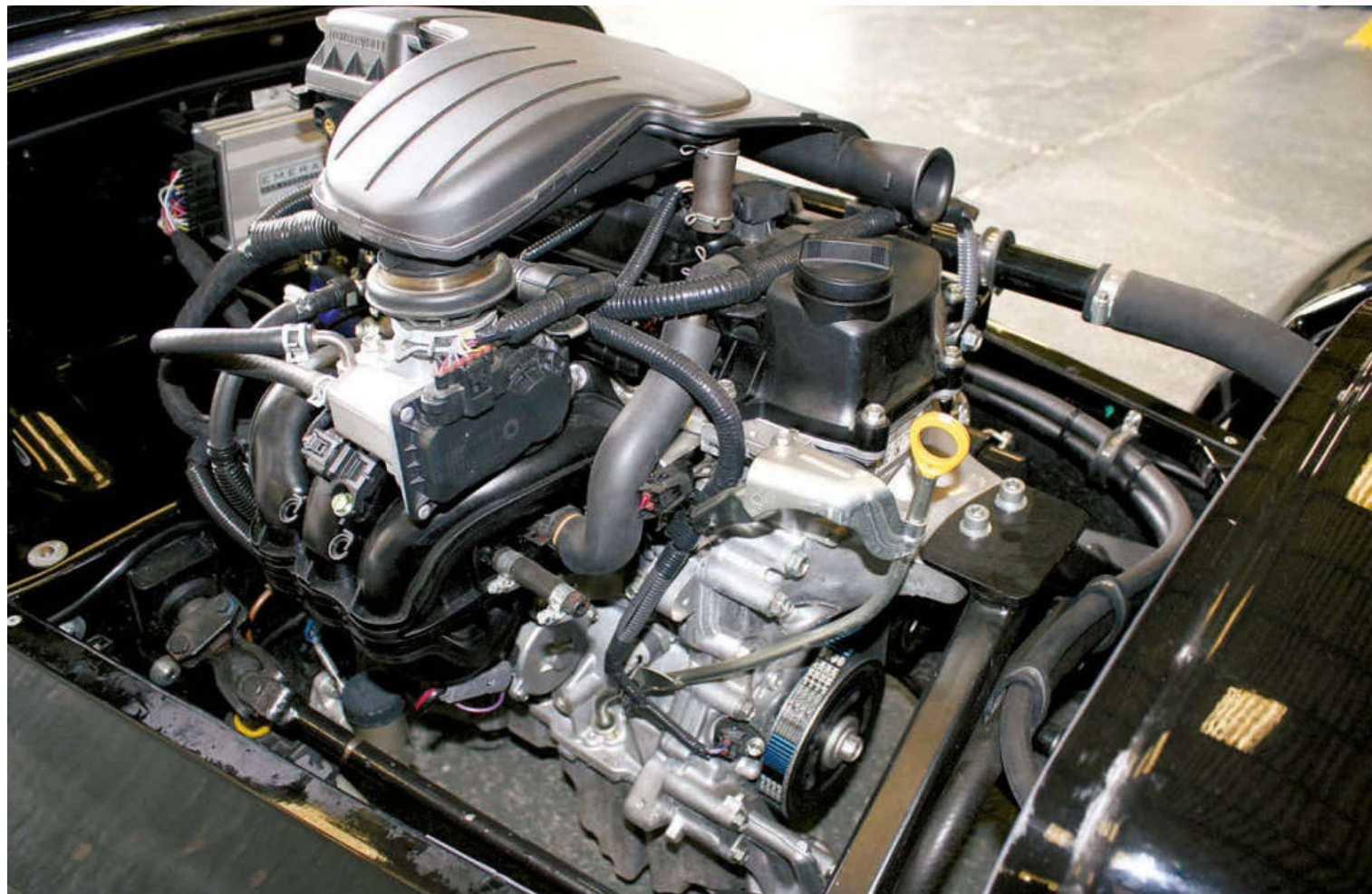
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Toyota 1KR-FE

If the kit market follows the mainstream industry into downsizing, it doesn't need to diminish the fun – as Chris Pickering has been discovering by studying Toyota's 1.0-litre three-cylinder engine.



Small is beautiful. At least that appears to be the thinking in the mainstream car industry at the moment where 'downsizing' is every executive's new favourite buzzword. This made-up term was coined to reflect the rapidly-shrinking capacities and fast-reducing cylinder count we see in everything from Fords to Ferraris.

One of the earliest converts to this trend was Toyota with the 1.0-litre naturally aspirated triple found in the Aygo, the Yaris and the recently defunct iQ. Displacing all of 998cc and rated at 68bhp in standard form. It might strike you as an unlikely engine for a kit car, but you'd be wrong to dismiss it.

For a start, engines like this are the future of the car industry. Downsizing may be the latest fad, but it shows no signs of going away. Combined with turbocharging (more on which in a minute), it provides a solution to the increasingly stringent emissions requirements targets that are being laid down for mainstream manufacturers. And where the global car industry goes

the kit car market will surely follow.

One of the good things about the Toyota engine, from a kit car perspective, is its ubiquity. Alongside its in-house applications, the 1KR-FE (to give the engine its full name) has also seen service in the Peugeot 107 and the Citroën C1. Their combined

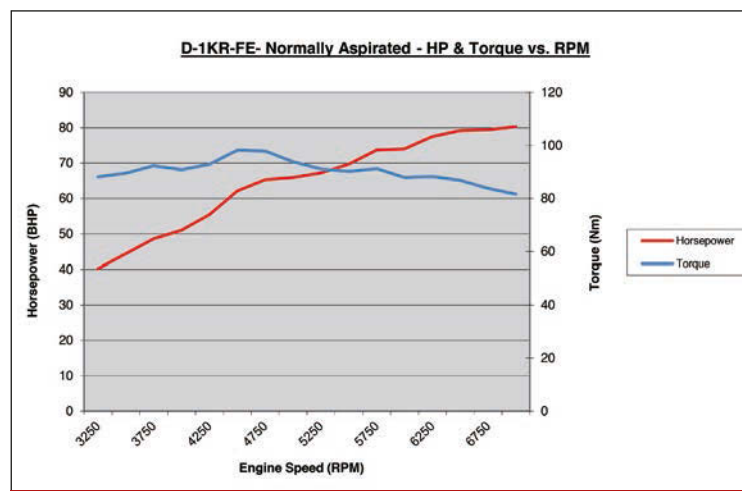
popularity with young drivers ensures you'll never be far from one skidding its way erratically into the scrapyard, but the engines are also available brand new from UK importer DEE Ltd.

The Leamington Spa-based company has links with Toyota's head office in Japan and has been supplying the engines

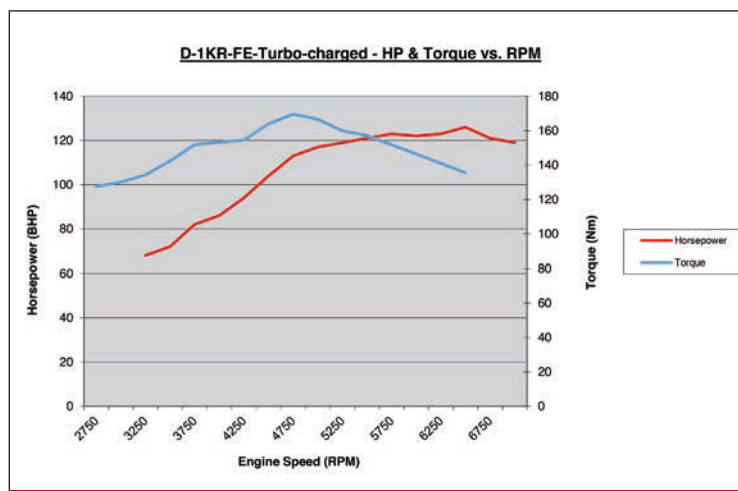
Below: Are the Toyota Aygo (and its Citroën C1 and Peugeot 107 sister cars) unlikely donors?



"A fully-dressed 1KR-FE only weighs 67kg, making it one of the lightest car engines on the planet"



Above: Torque curve of the naturally-aspirated 1KR-FE engine is very flat.



Above: Turbocharging adds to both power and torque figures significantly.

for around five years. During that time, it has honed its own versions of the 1KR-FE using an MK Indy as a testbed.

"It's just a lovely compact little engine," comments Nathan Poole, powertrain applications manager for DEE Ltd. "We put our standard engine in the Indy, and it's great fun straight out the box. It's not manic, but it's fast enough to be entertaining and it's very easy to upgrade if you want more power."

Thanks to an Emerald ECU, DEE's standard crate engine produces 80bhp without any mechanical modifications. If that sounds less than exciting, it's worth bearing in mind that a fully-dressed 1KR-FE only weighs 67kg, making it one of the lightest car engines on the planet. It's almost a third lighter than the Ford Ecoboost triple and comfortably less than Fiat's 900cc two-cylinder Twinair. For reference, a

similarly powerful Caterham Seven 160 (powered by a three-cylinder Suzuki engine) is good for 0-60mph in 6.9sec and just over 100mph flat out.

The easiest route to more power is forced induction. DEE has developed a turbocharged version of the engine that produces 125bhp and more than 125b ft of torque. Silverstone-based TTS Performance, meanwhile, offers a supercharger conversion that produces similar figures. Both are comfortably achievable on the standard internals, while other companies are understood to have reliably reached more than 150bhp using uprated parts allied to a standard block and head.

"We've since put the turbocharged engine in the MK and I think it's an absolutely perfect match for a Seven. It's very driveable, with bags of torque, but it's an absolute rocket," says Nathan.

Useful contacts

Engine supply: DEE Ltd, Leamington Spa, Warwickshire. T: 01926 426225. E: info@dee-ltd.co.uk W: www.dee-ltd.co.uk

Engine supply and rwd bellhousings: RWD Motorsport, Colne, Lancashire. T: 01282 863286. E: info@rwdmotorsport.com W: www.rwdmotorsport.com

Synergy racing car: Aquila Racing Cars, Denmark. T: (+45) 40 52 11 30. E: info@aquilaracingcars.com W: www.aquilaracingcars.com

ECUs: Emerald M3D, Watton, Norfolk. T: 01953 889110. E: sales@emerald3d.com W: www.emerald3d.com

Supercharger conversion: TTS Performance, Silverstone, Northamptonshire. T: 01327 858212. E: sales@tts-performance.co.uk W: www.tts-performance.co.uk

Rolling road: Northampton Motorsport, Northampton. T: 01604 766624. E: northamptonmotorsport@btconnect.com W: www.northamptonmotorsport.com

Below: Toyota three-pot weighs only 67kg when fully dressed.



Below: The 1KR-FE takes up little space, even in a typically confined kit car engine bay.



"Great for a race car"

To find out more, we spoke to Paul Hill, UK importer for the Aquila Synergy, a kit-built racing car that uses a mid-mounted 1KR-FE coupled to the original transverse gearbox. "It's great for the back of a racecar," he comments. "It helps us keep our overall weight down to 380kg dry. It's also very affordable and readily available. We use quite a few parts from the donor and you can get a Cat C Aygo for under £1000."

Fitted with a MicroSquirt ECU from DIY Autotune the engine produces 81bhp, giving the flyweight Synergy a power-to-weight ratio of 213bhp per ton – comfortably more than a 2.7-litre Porsche Boxster. Aquila UK has demonstrated this to great effect in the BRSCC Open Sports Car Series, where it currently supplies three teams, including the Class E leaders.

"The only issues we've had came from mixing parts from different manufacturers," says Paul. "It turned out that using a Citroën ECU on a Toyota engine triggered the immobiliser, but since switching to the MicroSquirt it's been very straightforward."



One of the most endearing features of its engine is the soundtrack. Despite being markedly undersquare (with a 71.0mm bore and 84.0mm stroke) the little triple revs enthusiastically, emitting a characterful thrum, even in standard production form. "It sounds like a baby

Porsche. I love it," notes Nathan.

With only three cylinders, the 1KR-FE is also a very compact engine. Measuring just 500 by 600 by 700mm, it looks dwarfed in even the tightest engine bays. In front-engined longitudinal applications, this allows the engine to be mounted well back in the chassis, which combined with its minimal weight could dramatically reduce the load on the front axle. Anyone who's ever driven a Pinto-powered Seven followed by a K-Series or bike engined variant will appreciate just how much difference this can make to the dynamics.

Speaking of bikes, some might argue that the Toyota triple's size and weight benefits are a bit mediocre in comparison. After all, a Yamaha R1 engine is a couple of kilos lighter still, despite carrying an extra cylinder around, and that produces anything up to 180bhp in standard form. The counter argument is that a turbocharged 1KR-FE, while less powerful, will give you nearly 70 per cent more torque and does so while keeping the track day scrutineers happy with its noise output. It should also be a doddle to get through the IVA emissions tests, with the standard engine now dipping under the 100g/km mark, even with an 840kg Aygo to lug around.

In production form, the 1KR-FE is used exclusively in transverse-engined front-wheel drive applications, with a slick and reliable Toyota 5-speed gearbox. Recently, however, companies like RWD Motorsport have developed rear-wheel drive bell housings that enable it to be mounted in front-engined

longitudinal applications. The most common gearbox for this type of conversion is the W56 from the Toyota Crown saloon, which although relatively unknown in this country has sold in huge numbers worldwide for decades.

DEE also imports the transmissions and Nathan says they're winning over a lot of kit car builders: "The W56 is a very robust 5-speed 'box that's very cheap to run and it's still in mass production. It makes a nice replacement to something like a Type 9 and it's an easy fit down a Seven-sized transmission tunnel."

Another major strength – and arguably an area where the 1KR-FE trumps rivals like the Ford Ecoboost – is its ease of installation. The only hardware modification DEE makes to the standard engine is a new connector on the end of its wiring harness to accept the Emerald ECU.

"The 1KR-FE is very simple to marry up to an aftermarket ECU, so you don't have to bolt half a Toyota to it," jokes Nathan. "Our crate engines are literally plug and play – we'd recommend a rolling road session to get the most out of them, but we've got a set of off-the-shelf calibrations for naturally aspirated, turbocharged and supercharged variants, which still retain things like the variable valve timing and the fly-by-wire throttle control."

The ease with which the 1KR-FE can be transplanted into a homebuilt car surely has to be good news for the kit car industry. Like it or not, downsizing is coming. But this proves the new breed of engines doesn't have to be a headache. Maybe small really can be beautiful? ■

Below: DEE's experience of the Toyota 1KR-FE engine in kit cars is more than theoretical – it has this MK Indy to use as a testbed for the installation. Bonnet bulge reveals that it's a tall engine.



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Win! Flymount Package

Last month we highlighted the ingenious Flymount S.1, an amazing case with integrated lens to turn your iPhone into a capable action camera. Well now we've gone even better, and have two S.1 units to give away, each with the company's Flymount Original camera mount.

The Flymount S.1 is the world's only iPhone case with built-in image rotation and widening. This drastically improves the options for mounting the iPhone on a roll bar, helmet or any other location

for capturing action footage. The waterproof S.1 case is made of tough polycarbonate which is lined with soft silicone. The case can be ordered for iPhone 4, 4S, 5 and 5S.

The Flymount Original is the perfect mounting system for the S.1 although the mount is designed to accommodate any standard camera. Simple and yet strong, the Original's wide clamping jaws are perfect for locating a camera onto any typical rollcage.

The Flymount S.1 normally

retails for £69.99 and the Original is a further £64.99. Both can be ordered direct from Flymount via its website. W: www.flymount.com

THE COMPETITION

There will be two winners of this competition, each receiving a Flymount S.1 case and Original camera mount. To have a chance of being one of them, just answer the question here. Closing date for entries is Friday 20 November.

Question – The DDR Miami featured elsewhere in this issue is a

inspired by which supercar?

- A) Ultima Evolution
- B) Ferrari 458
- C) McLaren F1

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Jason Burrage

PROJECT
DeHavilland DVT GTS V6

AGE
44

OCCUPATION
Project manager

PROJECT START
November 2014

At the end of my last report, I was busy trying to work out all the coolant pipe runs in the engine bay. I'd done the major ones and fitted an air bleed at the highest point that'll go to the expansion tank. These were made up with TIG welded aluminium pipe, then connected to the engine using silicone hose. I've also now fitted the smaller heater hoses and the MG TF expansion tank in the engine bay. It's all worked out reasonably well, except I wasn't too happy with all these hoses connecting to the standard MG Rover plastic thermostat housing that's held in place with a single bolt.

This housing is a known weak point on KV6 engines, so I'd already replaced it with a new one. However, in trawling the internet forums I found out about a guy in South Africa who makes aluminium ones. They're reputed to give better cooling efficiency and last forever, so I placed an order. It arrived a few days ago and is now fitted to the engine, allowing me to complete the cooling system in the engine bay.

The driver's door has also now been fitted and, in the process, I came up with a great idea to make refitting simple. Originally, I had planned to use nuts, bolts and large washers to bolt the hinges to the fibreglass doors, but this was awkward and made alignment quite time-consuming. I decided to order some 10mm thick aluminium flat bar to drill and tap it to match the hinge mounting holes.

This became a combined captive nut and load spreader plate on the back of the fibreglass, creating a very stiff and strong mounting point for the hinges. Some polyurethane adhesive and long pop rivets were used to hold it in place once alignment was set, so now I can remove and refit the doors with perfect alignment every time. It also avoids me getting fibreglass splinters in the back of my hands as I reach into the doors to fit nuts and washers!

A similar plate with clearance holes was also bonded onto the outside of the fibreglass using fibreglass filler. This creates a nice flat surface for the hinges to bolt up to and sandwiches the door panel for extra rigidity. It's great ideas like this that can make your day when building a car.

With the doors hung, the locks were fitted and strikers lined up in the door shut. Once again, I created some threaded plates to fix in place behind



Above: Stronger thermostat housing made in alloy.

the fibreglass, making removal and refitting of the strikers a breeze.

I still have the ability to move the hinges forwards and backwards on the chassis to move the door up and down. I need this to compensate for the weight of the windows and frames once fitted. Once it's all aligned, I'll spot weld the hinges to prevent unwanted movement.

With doors, locks and strikers fitted correctly, I could finally fit the fuel tanks and finish the fuel system as far as the pressure regulator. The engine bay isn't finished though. I have the throttle bodies to buy, plus the ECU and associated wiring loom.

At this point, I decided to move to the front of the car and fit the bonnet. I had to sand back the fibreglass edge



Above: Plates for door hinge help spread the load.

around the bonnet aperture to allow fitment of a rubber seal as it was a bit too thick for the seal to push on. With the bonnet laid in position and held in place with tape and cardboard wedges, some big head fasteners were bonded to the underside to line up with the hinges. I then glassed over the fasteners to ensure they're secure.

While doing this, I discovered the bonnet outline isn't so good on the passenger side, leaving a big gap in the shutline. You can see from the photos that I simply cut slots in the fibreglass with a cutting disc, prised it apart to get the right outline and then used fibreglass filler to fill the slots and bond it all back together. It's not very pretty right now, but the bodyshop will tidy it all up when it goes for paint. At

Below: Bonnet shape has been modified slightly to make it a better fit.



Next issue

JOHN CLEMENTS
Tiger Supercat

ANDY GREEN
Healy Enigma

IAN JACKSON
GKD Legend

ROSS MAYNARD
Tiger Super Six

ED MORTON
Nova

JON PAGE
GBS Zero

"The car was now ready to be lowered onto its own wheels for the first time, a big milestone we all look forward to"

least the bonnet fits nicely, which will allow me to fit the bonnet catches and strikers accurately.

One of the things I learnt from the Stoneleigh show was just how offset the driving position is in a Dino. I'm building this car to be fairly close to the original, but not at the expense of comfort. Having looked at the dashboard, the instrument pod can easily move over a few inches, as can the steering wheel. That would put it very close to the centre of the driver's seat. I've therefore cut the steering column brackets off the chassis and welded them back on 2in to the right. The brake pedal has also been moved over nearly 3in as currently it's very close to the clutch pedal.

On the subject of brakes and clutch, I've also now bled the brakes. One evening, a neighbour wandered across after work to say hello and was duly roped into pedal pumping. The clutch line has also been fitted. This is 4AN braided hose throughout, purely for convenience and to minimise joints.

The car was now ready to be lowered onto its own wheels for the first time, a big milestone we all look forward to when building a car.

The brakes and clutch aren't finished though. I've increased the pedal ratio on the clutch from 4.8:1 to 6.5:1 as it was a bit stiff for my wife Kseniya to use comfortably. I also moved the pedal an inch to the right to be more in line with the driver's seat and new steering wheel position.

From reading the CKC article on the DeHavilland DVT (March 2015 issue), it appears the brakes need a firm push which won't be ideal for the wife either. Fitting the MG TF servo isn't a convenient option, so I decided to modify the pedal ratio from 6:1 to 8.4:1. This creates a bit more travel, but far less effort is required. Fitting a gauge to the brakeline, Kseniya was able to get it well over 1000psi with a hard press. Of course, the disc size and tyre radius will ultimately determine how well that stops the car, so we'll have to wait until the engine is running and test them on our driveway.

Just like the clutch pedal, the brake pedal also got moved to the right, but this time by 3in. This brings it more in line with the driving position and increases the space between the pedals as they were very close.

I felt it was now time to start playing



Above: The wiring loom ready to be fitted.

with electrics, so I retrieved the MG TF wiring loom from my stock of donor parts. It was poorly taped up at the factory and contained a number of circuits that simply aren't required in the DeHavilland DVT. I unwrapped what little loom tape there was and stripped out the unwanted circuits – ABS, EPAS, airbags, seatbelt tensioners, etc. This has the advantage of leaving some spare fuses and relays, which I'll use for heated seats, a second radiator fan and a GPS tracker. The loom was then taped back up properly, using cloth loom tape to prevent squeaks and noises on bumpy roads.

When fitting the loom, first job was to cut holes in the fibreglass panel above the driver's footwell and mount the under-dash fuse box. This was actually made a little easier by having moved the steering column over. The loom was then laid out in place and cable mounts pop riveted to the chassis and panels to hold it at intervals of less than 30cm, as per IVA requirements. Anywhere the loom might rub fibreglass or an edge, or vibrate against something, I've used self-adhesive closed-cell foam for protection.

The under-bonnet power distribution box and battery were then fitted before attaching some of the earth points on the chassis using rivnuts. The wiring through to the radiator fans, horn, heater fans and front lights is now pretty much in place, with just a few wires to extend so things can be connected up.

With the wiring loom coming along nicely, I couldn't resist having a little

play to see if the key fobs and central locking still worked. DeHavilland don't normally retain the central locking as the MG TF units don't fit, so I've purchased some universal central locking motors. With them temporarily connected to the loom, I connected the battery, pressed the key fob buttons and found that they actually work!

The original Dino uses two heater fans, mounted at the front of the car either side of the radiator. The air is then ducted to the heater matrix and dashboard vents. I've chosen to loosely replicate this instead of modifying the MG TF heater unit. I haven't yet worked out the exact ducting routes, but the fans and heater matrix are mounted in place.

The heater matrix simply connects to the cooling system via a couple of 15mm copper pipes that run down the centre of the car. I use solder fittings on the ends of the pipe to provide a sealing/retaining ring for the 16mm hose.

One of the things I'd previously done – and wasn't happy with – was the mounting of the gear selector. I'd bolted it to the fibreglass floor using the standard MG TF rubber mounts. It wasn't at all rigid and made gear selection rather random. A quick call to Terry at DeHavilland confirmed I should bin the rubber mounts and could add a steady between the mechanism and central chassis rail. Out came the MIG welder and an extra bracket was added, making the gear selection very positive and easy.

That's it for now. Next job will be to finish the wiring at the front of the car and route the loom through to the engine bay and boot area.

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Stuart Bruce-Jones

PROJECT
AGM WLR

AGE
30

OCCUPATION
Aerospace project manager

PROJECT START
August 2010

Have you all seen the new Mad Max movie? Don't worry, it's not a permanent look! It's a bolt-on roll cage, finally complete, for the inevitable track days ahead!

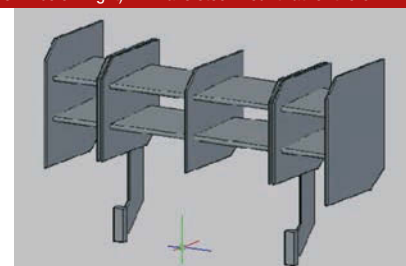
The eagle eyed among you may notice the rear wing mounting plates sitting behind the fuel tank. These obviously require a rear wing! Not being happy with the OEM attempt, I decided to design my own with CAD. The rear wing will generate real down force courtesy of some high lift, low drag carbon fibre laminated wing profiles hot wire cut from engineering foam.

The car is now being prepared for the twin intercoolers that will feed the four T025 turbochargers (yes, four) and a charged rear diffuser! A charged rear diffuser is where the hot exhaust gases 'turbocharge' the exit of air flow from underneath the car and increase downforce. More important than all of this is that the car is now officially in the paintshop queue. Place your bets!

Oh, and while all this was going on, I still found time to have my first born. Welcome to kit car building world, baby Clark!



Above: Roll cage will be removable. **Below left:** Wing (shown below right) will have steel mount rather than the GRP.



Jim Hodgkinson

PROJECT
JZR

AGE
59

OCCUPATION
School DT technician

PROJECT START
November 2013

It is with a sad heart I that have to stop building the JZR, and for those who may be following the build I am sorry. As I have said in my reports previously, I have been looking to move to France. My wife and I found our dream home in a dream place for a dream price, so we made the decision to pack in our jobs and go. My intention was always to finish the build once I was settled in, but the truth and realisation was that it could not happen. To get it finished then get it back to the UK for MSVA then registration and all that entails was just a bridge too far.

In truth, I sat and chatted about the whole thing with my wife who can often see the whole picture better than I can. Dreams are great, but the reality was very different so the build had to go.

Now to lose the JZR on its own was bad enough, but my Pembleton had to go too. I was forced into making decisions I didn't want to. The Pembleton was my little metal sweetheart – we had both come through hard times. I was very poorly when I started building her, and she pulled me through. Even now, I remember the late nights working on

sometimes insurmountable problems and feeling self-satisfaction knowing I had cracked it. For those of you out there who have built their own car, this will all seem very similar to you.

I placed the ads and waited for the response, which was overwhelming. I could have sold 20 Pembletons and the same number of JZRs. What wasn't

expected was the man who turned up to try out the Pembleton – Jim McLeod.

I took him for a test drive and he sat in the car not wanting to get out. I knew right there and then that 'Little Blue' was going to a good home. The look in his eyes said it all then he asked if he could buy her. We sat there for a while, me sad knowing I had just gone

Below: Jim has sold both his JZR project and his Pembleton. Jim McLeod is the new owner of the latter.



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for my last drive and Jim excited as he had bought his little dream car. I put the car in the garage and sat in her I can not explain my feelings.

Jim turned up a few days later and I couldn't even bare to watch her go. I told myself we all need to move on. If I said the same thing happened with the JZR – a mirror experience, a man who fell for the kit and whisked her away – I wouldn't be lying.

Realising that I was upset, my wife then did something I never expected from a woman who shared no interest at all in my builds or car enthusiasm. She said: "Why don't you get another car, I would love a Mehari and we can both enjoy her." So the search was on and I found one which is French registered and needs some TLC. Here comes the rub: I have told my wife it's a

joint project – and she seemed as excited as me tackling a new project and has not stopped talking about it.

So I may have lost two kit cars, but I have gained a wife who now understands what building and owning a kit car is all about. I just can't wait to drive to the beach together on a summer's day knowing that I have converted the unconvertible to my love of cars. Happy days!



Vivienne Lodge

PROJECT
Westfield SE

AGE
56

OCCUPATION
Retired driving instructor

PROJECT START
March 2015

Fitting the fuel tank and ancillaries has been my challenge over the past few weeks. This was a long job and needed to be carefully thought out beforehand. I started by locating the two P-clips which hold the fuel pump and fuel filter onto the frame. I lined the filter clip with rubber tape. The pump has its own rubber sleeve. There was a bit of confusion as to where to fasten the fuel pump as the photograph in the manual wasn't too clear. After a phone call to my helper at Westfield, I was sent some photos of pumps that had been fitted to cars in stock.

Firstly, I prepared the pump by attaching the fuel unions to the outlet and inlet, taking care not to over tighten the threads. Then, in order to attach the brackets, I needed to drill into the chassis frame. After drilling for some time, I was thinking something is not as it should be! Not a scratch, let alone any sign of a hole appearing. Surely steel couldn't be this tough? I suspected my hammer drill wasn't hammering, so I took it back to the shop. It turned out that I was right. So, a new drill later and a strong cobalt drill bit fitted, off we went – like a knife through butter. Well, almost! Let's not get too carried away. Holes drilled, brackets bolted into place and pump and filter are in position.

I had to snip off the connectors on the loom and replace them with small eyelet ones before using my new crimper to secure them onto the pump. Fitting the various rubber hoses between the tank, pump, filter and outlet and return pipes took a bit of fathoming in order to find the best routes around the chassis, tank and differential. I covered each hose with a split conduit plastic sleeve wherever it might come into contact with the chassis. This was attached using a tie wrap at each end. The hoses were fixed into place with jubilee clips.

I then lined the tank frame and the tank holding straps with protective foam. Preparing the actual tank was my next task. I wound plumbers' tape around the screw threads of the right angled inlet and the spigot for the



Above: Viv's main focus this time has been fitting the fuel tank and its related ancillaries.

outlet before screwing these into the tank. I had to use a cloth and a spanner to tighten them and, although they had tapered threads, I was a bit worried when they proved difficult to nip up. Anyway, they seemed tight despite some thread still visible. Half inch bore pipe was then connected from the spigot to the fuel pump inlet.

Once the tank was in position on the frame, I connected the fuel sender and clipped the hose out of the way onto the chassis frame. The tank straps proved really difficult to attach as they didn't reach. They were about a centimetre short. No amount of trying to pull and stretch them over the tank seemed to work! Eventually, I used a screwdriver through the holes on the straps to lever the straps down. The problem here came when the straps became so weakened with the constant

stretching that one snapped and the other looked really thin. I decided to ask for a couple of new straps which arrived a couple of days later. These seemed to fit much easier and in no time they were bolted into position.

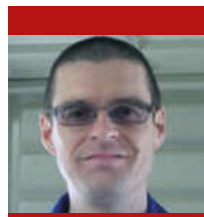
The inertia switch was next. I tested it first by tapping it to reset the ball bearing inside the switch and then drilled the vertical plate on the chassis behind the differential and bolted it into place. Finally, I attached the earth strap between the tank and the chassis, liberally applying some grease on the connectors. I used my new rivsert tool for securing the strap to the chassis. This is a really neat way to attach lightweight items without the need to drill all the way through the chassis frame. I'm looking forward to fitting the handbrake, propshaft and steering rack next.

Below: Faulty drill made fitting brackets tricky!



Below: Fuel sender in place.





Chris Haysom

PROJECT

RoadRunner SR2

AGE

45

OCCUPATION

Charitable trust

PROJECT START

January 2014



Above: Donor loom unraveled to see what goes where...

How time flies. It barely seems any time at all since my last report! Not too much to report this time, I'm afraid. More, this time fairly serious, non-car issues have kept me out of the garage. For the last seven years or so, I have been working at a day centre for adults with learning difficulties but the direction the centre has been moving in recently has made me feel it's time to move on. I am trained in horticulture and decided to head back in that direction and thought I had found the perfect job. However, after a few weeks I am starting to think I have made the wrong decision and now feel in limbo. So with this in mind, please excuse the brief report.

Last time, I had started to lay out

the mass of reduced donor loom in rough positions to get an idea of where everything needs to go and how much needs to be reduced in length. So far I have unraveled the front light wiring and draped it over chassis rails and fed the rear loom through the tunnel to connect to the main loom under the dash – somewhere! It's still very messy and in the early stages, but I think I may temporarily fix in the propshaft to give an idea of clearances for all the cable runs.

One small job to tick off the list is the earth strap from the fuel tank to chassis to comply with IVA, particularly as my tank is secured in place with insulating rubber bobbins.

I received my exhaust link pipes back

from Mike at RoadRunner with a boss welded in to accept a lambda sensor.

I am gradually removing parts from the engine to give them a good clean up. This is where my old digital camera is great for taking a series of shots of the part assembled and being broken down, so hopefully the re-assembly procedure should be fairly straightforward. The rocker cover has been removed as well as any redundant parts such as the power steering pump. The exhaust manifold will have as much of the old carbon removed and then painted with high temperature paint.

That's about it for this report, hopefully I can return to car building with renewed vigour next time!



Above: Earth strap from fuel tank to chassis will satisfy the IVA inspector.



Rob Davenhall

PROJECT

Midtec Spyder

AGE

37

OCCUPATION

Specification manager

PROJECT START

April 2014

They say things happen in threes! First I broke the ST engine, then the TT engine gave up. This was understandable as it was under heavy usage on a track day, but then to have the two-year old Volvo blow an intercooler as well... that about sums up my luck with cars at the moment.

I did, however, have a fab time on my epic road trip round Europe with the highlight being the Stelvio Pass (all photos can be found on my twitter page @robertdavenhall). I have to say it is one of the most amazing but maddest places I have driven. Going up, you not only have to contend with the sharp hairpins and severe drops but cyclists, motorbikers, buses, Italian drivers and, to top it all, a group of skateboarders! All of whom are also trying to get up or down the pass faster than the next! Utterly bonkers but, yes, I would go back tomorrow!

The Midtec is starting to come together again with a couple of days spent on the dashboard. Currently,



Below: Alloy pipes were run down the wrong side of the car – manual was written for Ford Pinto engine!

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I'm refurbishing the one I got with the donor Midtec as it is already bonded to the body and screen. So to save a bit of time and money I will be fitting the red body on, as I want to get at least one track day this year in it. The current dash has your typical '90s dials and switches, so desperately needs bringing up to date. New Savage switches and a wonderful DigiDash from ETB will help do the trick.

I have also been playing with the radiator and cooling system. I have currently followed the build manual on this and managed to successfully source a brand new Sherpa van radiator, as advised in the build manual. Speaking with a few other Midtec owners, there appears to be quite a common fault of overheating or general cooling issues!

Being the novice I am, I have tried to follow the build manual where possible, but this soon led to my first issue. The alloy pipework is advised to go down the driver's side, which I did, but on the ST engine the cooling is on the opposite side to that of the Pinto, so needed to be switched over to the driver's side. Not a huge issue, but I wanted the pipework to be minimal and I now had pipework running right across the engine bay, which isn't ideal. I guess a trial fitment would have been better.

I have also swapped the black hosing to some fancy silicon flexi hosing from ASH with matching fastening. I wanted it to be quite stiff and solid.



Above: A start on the interior – pedals in place.



Above: Dashboard was looking decidedly 1990s...



Above: ...so out came the original dials...



Above: ...and in went an ETB DigiDash.

The mounting of the radiator is still one thing I'm mentally having arguments about to myself. The manual says to fix the bottom and rest the top on the bodywork! I'm not convinced yet, but thought the extra-stiff hosing may help stabilise it. If not, I think I'll make some more brackets. For now, though, I'll trust the manual and go with it!

Other tidying up areas addressed this month include some blue pedals, more clips for the wiring and some new steering rack mounts. Basically, getting the front complete and tidy ready to

accept the body.


The engine is now gone. It only went away to be rebuilt last week, so should be back for the next report where I will need to address the clutch slave mounting position. That requires some gearbox modifications to fit correctly. Once the engine is back in, I will put the body back on it and finish the wiring.

The end is in sight! Well, for one Midtec anyway. My mind is going overtime on all the mods I can do for the second one, including the Audi 1.8 turbo engine installation!

No progress to report on the car build over the summer, I'm afraid. Family holidays, and a hectic period at work have left me with very little time at home to spend in the garage. I had arranged a few days off at the beginning of September after

my girls had gone back to school to have some quality time spent with the car, but those plans were properly scuppered by emergency house DIY. Instead of fitting the fuel tank to the car, I found myself having to replace the oil tank for the house, swapping

spanners for shovels. Yet again, as a hobby, the car took its place some way down the list of my priorities. I remain hopeful that I will be able to make some progress soon, with the aim of getting the engine in and an exhaust manifold made being my next milestone. ■



Tom Hyland

PROJECT
Raw Striker

AGE
41

OCCUPATION
Software development manager

PROJECT START
January 2012

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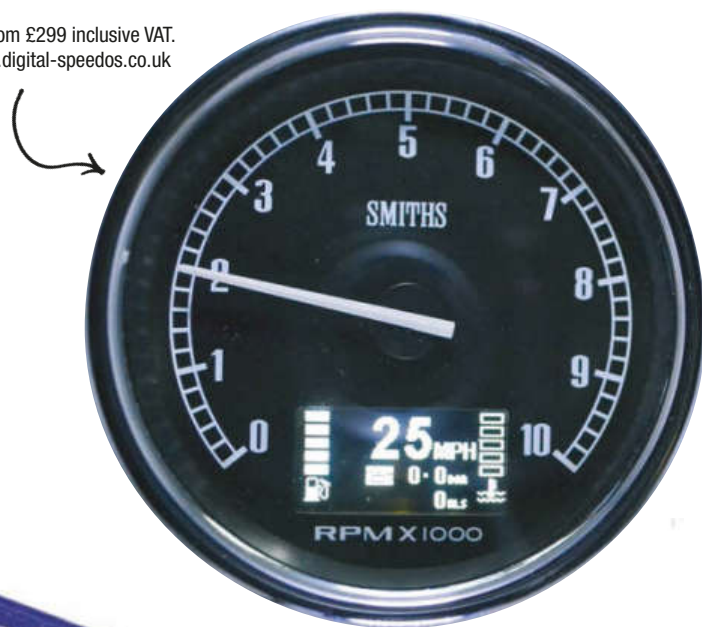
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New Products

New OLED Smiths gauge

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Price: From £299 inclusive VAT.
W: www.digital-speedos.co.uk



Remove stubborn nuts!

This set (part number 81815) of cunning sockets features a design that 'bites' down on stubborn or damaged nuts to achieve maximum gripping power. Sounds perfect for when stripping down a donor car for your next project.

Price: £23.90 inclusive VAT.
W: www.toolstation.com



Will you be seated?

Draper Tools has just launched this height adjustable stool (part number 73848). Mounted on five sturdy casters and with a lower tray to hold tools and parts, this could be perfect when working on a chassis mounted on trestles.

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W: www.drapertools.com



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Kit Car Brakes

Ed Morton talks you through the entire braking system of your kit car, and what you need to consider at each step of the way.



I hope you never have to experience the sickening, frantic, helpless sensation of pressing a brake pedal and feeling it sink to the floor. This happened to me several years ago, in a Marcos Mantula. Rather than use the correct, inexpensive and freely available master cylinder to brake line union, the car's creator had brazed together an impromptu solution that unsurprisingly failed. Spectacularly. I lived to tell the tale, and the Marcos is now in Australia, which is almost far enough away. The experience left me with an as-yet unfulfilled urge to meet and severely injure the Marcos' previous owner, and new fascination for braking systems...

GENERAL PRINCIPLES

It sounds obvious, but braking depends on frictional forces between the tyres and the road surface. Kinetic energy (the thing we're trying to get rid of) is converted into heat, and maybe a small amount of light and sound. If you emit a lot of sound when you stop, such as a loud crunching, it indicates problems.

It's widely suggested that, since a kit

"Since a kit car will usually be lighter than its donor, the standard system should be more than adequate. However, kinetic energy is also proportional to the square of velocity, so if your velocities tend to be on the high side this might override any weight advantage"

car will usually be significantly lighter than its donor, the standard system should be more than adequate. Kinetic energy is proportional to mass, so this makes sense. However, kinetic energy is also proportional to the square of velocity, so if your velocities tend to be on the high side this might override any weight advantage.

As a general rule, if your front wheels lock before the rear wheels after a hard prod on the brake pedal, and, assuming you don't have ABS, your brakes are probably adequately powerful and reasonably balanced. In this situation, braking upgrades won't slow the car any faster – the original system has already achieved as much as it can possibly do by stopping the wheels from turning. Upgrades might give other advantages, however, such as resistance to fade from repeated high-speed usage, or a reduction in unsprung weight.

When a car brakes, weight is transferred to the front wheels, so the front brakes have to work harder than the rears. Because of this, front

brakes are almost always discs rather than drums, and the hydraulic system may be biased to send more of the pedal effort to the front brakes, either by using different master cylinder bore sizes for the front and rear circuits (more of this later), or automatic load or brake force sensing valves. The IVA regulations do not allow adjustable front/rear proportioning valves, even if the adjustment facility is disabled. IVA also requires a dual-circuit system design, so that if one circuit fails the other circuit is preserved. My ill-fated Marcos had one poxy master cylinder for all four wheels... and 230bhp.

INDIVIDUAL COMPONENTS

Pedals: Typical kit car pedals are either floor or pendulum mounted. Floor mounted pedals are compact, and look 'racy', but can feel awkward to use. More traditional pendulum mounted pedals follow the arc of a driver's foot as it pivots more closely than floor-mounted designs – it's probably worth trying both systems before you decide. Complete 'pedal boxes', which



Above: The Marcos that, ahem, inspired Ed's interest in braking systems.



Above: Most aftermarket pedal boxes use a pattern master cylinder of Girling origin.

include master cylinder mounts, are widely available. These generally use two separate brake master cylinders connected by a balance bar, but Great British Sports Cars produces a neat pendulum pedalbox kit designed for a single tandem master cylinder, or alternatively a separate Wilwood clutch pedal kit could be coaxied into service as a brake pedal.

Pendulum pedal boxes can mount the master cylinders facing either towards or away from the driver; whereas floor mounted pedals usually bolt up to the bulkhead at the end of the driver's footwell, with the master cylinders in the engine bay. A rather convoluted floor-mounted pedal box with the cylinders mounted under the driver's feet is also available, but it's not especially elegant. For particularly awkward packaging problems, it's worth bearing in mind that pedal boxes can also use vertically mounted master cylinders, as found in Rover Minis, Metros and Vauxhall Corsas.

A foot pedal magnifies the force from the driver's foot to a degree that depends on the position of the pedal pivot, or the pedal ratio. Donor pedals usually come from servo assisted braking systems, which are less reliant on leverage from the pedal so can have lower pedal ratios. This is worth bearing in mind if you plan to re-use them.

Increasing the pedal ratio will magnify the force applied to the master

cylinder, but will require an increase in pedal travel for the same amount of master cylinder stroke – this may not be possible in a confined footwell, and can be difficult to achieve with more awkward to use floor-mounted systems without dislocating your ankle.

Master cylinders: Most aftermarket pedal boxes use a standard pattern of master cylinder, first produced by Girling, with two mounting holes spaced vertically 57mm apart, a $\frac{7}{16}$ UNF inlet port and a $\frac{3}{8}$ UNF outlet. They are available with various bore sizes, in reassuring inch measurements, of 0.625, 0.70, 0.75 and 0.813 diameter. Wilwood, AP and Tilton also produce cylinders with larger bores.

Changing the master cylinder bore size changes the amount of force that the brake fluid exerts on the caliper piston, in a similar way to changing the pedal leverage by moving its pivot point. This might be counter-intuitive, but the explanation is fairly simple, and depends on the principle that the pressure inside a closed system is equal at all points.

In practice, this means that any force applied to a 2cm squared (or 0.625in bore) master cylinder is also applied to every other 2cm squared area within the braking system. So if the caliper has a piston area of around 22cm squared (roughly that of a Ford M16 caliper), it applies a force of $2\frac{2}{2}$, or 11 times the

original to the brake disc. This force multiplication happens because the master cylinder area is less than the area of the caliper pistons, and depends on the ratio of the master cylinder to caliper piston area.

A larger master cylinder area gives less force multiplication. Using the same caliper but a 5cm squared (or 1in bore) master cylinder, pedal force is multiplied by $2\frac{2}{5}$, or just 4.5 at the caliper, so the driver would have to press the pedal around two and a half times as hard, grunt a lot, or fit a servo.

However, the larger master cylinder moves about two and a half times as much fluid as the smaller one for the same amount of pedal movement. This becomes increasingly relevant with large aftermarket calipers. Even though a tiny piston movement of around 0.25mm is required to push the pad against the disc, this translates into around 11mm of movement in a 0.625in master cylinder using the M16 Ford caliper, or around 66cm at the pedal with a pedal ratio of 6:1. This would be acceptable to most drivers. Changing to an aftermarket 6-piston caliper, however, adds another 40mm of pedal movement, which could feel disconcerting.

Various spreadsheets and calculators to determine optimum master cylinder sizes are available on the web, but the easiest and most reliable solution is to speak to the Wilwood, Tilton or AP technical departments, who will happily



Below: Series of pics shows how the bias bar works...



Below: ...bearing located in the tube.



Below: Clevis.



Above: Assembly in pedal.



Above: Full set shown without pedal.



Above: In the neutral position...



Above: ...biased to the left...



Above: ...and crooked.



Above: This shows it binding...

calculate the required sizes for you. A degree of personal preference exists as well – some drivers are happy with a 'long pedal', whereas others find it disconcerting and are happy to push a bit harder in return for a shorter pedal stroke. Alternatively, Girling style cylinders are cheap, so starting with a 0.750 cylinder and experimenting might be an option.

Using different sized master cylinders for the front and rear brake circuits, usually to supply more pressure to the front circuit, requires a bias pedal box. This is slightly complicated. Instead of a simple clevis that attaches to a single master cylinder pushrod, the brake pedal has a horizontal retaining tube in which a spherical bearing can slide from side to side. The pedal is connected to the master cylinders by a threaded bar, that connects to a spherical bearing in the retaining tube, and threads into two rotating clevises that connect to the master cylinders.

If the threaded bar is turned, it rotates inside each of the threaded clevises by the same amount, so the distance between the clevises remains the same, but as the threaded rod is

turned the spherical bearing that is connected to it will move from side to side within the pedal retaining tube. This alters the position from which the pedal force is applied – if the bearing is centralised, equal force is applied to each cylinder. If the bearing is pushed all the way to one side of the retaining tube, the cylinder closer to it receives roughly twice the pedal force of the cylinder on the other side. The majority of the front to rear bias is set permanently by using different master cylinder sizes for the front and rear circuits, but moving the pivot point of the pedal allows some further tuning.

The master cylinder pushrods should remain close to parallel throughout the pedal travel, but the threaded bar connecting the spherical bearing may have to run at a variable angle as the pedal moves to accommodate the different master cylinder stroke lengths. However, the angulation must not be so pronounced that it causes the threaded bar or master cylinder clevises to bind on the bearing retaining tube.

The clearance between the clevises and bearing retaining tube should be around 3mm on each side. A large

washer is fitted between each clevis and the bearing retaining tube, which should remain loose during normal operation, but if one circuit fails the washer will cause the pedal system to bind and retain some braking power in the remaining circuit. This is shown in the series of photos

Once the brake bias is optimised, the IVA regulations require that the balance bar is vandalised to make it non-adjustable by fully welding the locknuts to the threaded bar, and welding up any remaining thread.

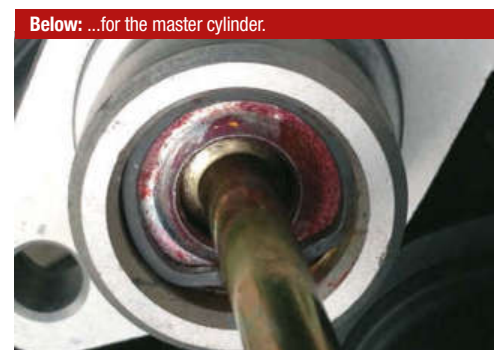
Wouldn't you rather just fit a nice, simple tandem cylinder? Tandem cylinders are simpler to install, but obviously don't allow variation in front-rear brake bias. Failure of one circuit will increase brake pedal travel, but the remaining circuit will still function. Their length, and often their bulky integral reservoir, can complicate the packaging of mainstream original equipment cylinders, although Fiat made a handy 0.75in bore tandem cylinder that uses a remote reservoir. Aftermarket tandem cylinders, with either integral or separate reservoirs, are available from Wilwood, Tilton and AP.



Below: ...it should have a slight gap for some play.



Below: Pushrod...



Below: ...for the master cylinder.

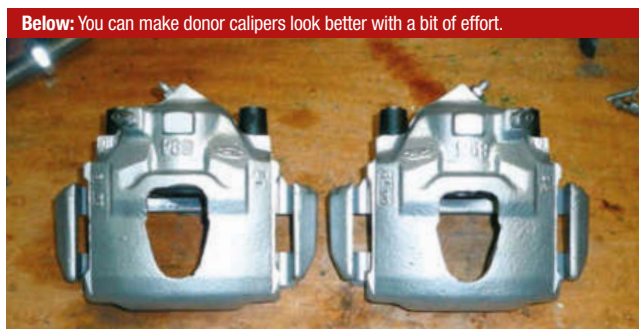


Above: Brakes pipes need to be neatly routed and rigidly fixed at least every 200mm.

Girling-type master cylinders use a pushrod with a mushroom end that is held in place with a circlip. Longer pushrods are available separately if necessary. Mainstream master cylinders used without a servo will need a new pushrod. This can be made very simply from a long M8 bolt with the head cut off and the stem shaped to match the original pushrod from the servo. This type of pushrod is not positively attached to the master cylinder, so the brake pedal will need to have a simple stop mechanism to hold it in the rest position. All pushrods should have a very small amount of play when the pedal is at rest.

Master cylinder reservoir: Reservoirs can be remote, and connected to the master cylinder by a pipe (which should be supplied with a declaration that it is the correct specification for brake fluid for the IVA inspector), or attached directly to the master cylinder. The reservoir must be mounted higher than the brake calipers or drum brake slave cylinders to maintain a slight fluid pressure gradient between the two. Without this, the caliper piston seals or brake drum return springs tend to draw the friction surface away from the disc or drum, so the next time the brake is applied, pedal travel is increased. If the reservoir can't be mounted high enough to eliminate the problem, a residual pressure valve in each brake circuit (10lb for drum brakes, 2lb for discs) can give the same effect.

A master cylinder reservoir must



Below: You can make donor calipers look better with a bit of effort.



Above: You'll need flexible lines in the system as well as hard lines.

have a low level warning light that can be tested from the dashboard – often this is combined with the handbrake warning light, so that it's tested each time the handbrake is applied. The minimum fluid level has to be clearly marked on the side of the reservoir, and a notice indicating the type of brake fluid used in the system must be placed within 100mm of the filler cap.

Brakes pipes: Running hard brake lines can be an immensely satisfying and creative exercise. Or, it can be a complete pain if, like me, your obsessive-compulsive disorder level isn't matched by your ability, because hard lines can look truly awful if done badly. Kuniifer (copper-nickel alloy) pipe is now used almost universally; it's slightly more awkward to shape than copper, but much more resistant to work hardening and cracking once in use. Copper pipe can be useful for making patterns, however.

Kuniifer pipe usually arrives in a roll, but it can be straightened by pulling it through a 5mm hole in a block of wood. To avoid kinking the pipe, bends should be made with the correct tools – they're widely available, cheap, and easy to use. It's also worth investing in a small roller pipe cutter, as square burr-free cut ends form much better flares.

Hand held flaring tools work reasonably well, and are the only option for making flares with the pipe in position on the car, but using a proper, vice mounted flaring tool is an almost religious experience. If you can stretch to one, I'd heartily recommend it.

It sounds obvious, but brake unions need to be fitted over the pipe before the flares are made, and on the correct side of any bends. Most people get this wrong at least once, though...

Flexible pipes are needed to join the hard lines to the brake calipers, and stainless braided pipes are a useful upgrade, as they eliminate the pressure-sapping bulging that can occur with original equipment rubber

pipes. Long braided pipes are a viable alternative to kuniifer pipes, if you really can't face all the bending, flaring and anxiety about leaks, or you really need to have colour coded brake lines. The master cylinder and caliper connections are stainless steel, so are much less susceptible to over-tightening than flared kuniifer unions, and the solid line to flexi connections found with traditional hard line systems are eliminated. These lines work particularly well in exoskeletal-all-gubbins-on-display style cars.

Stainless lines can be made up at home using Euroquip or Goodridge fittings, if you're brave, but several companies will make them up with swaged unions from your measurements. It's worth remembering that each line needs at least one swivel, banjo or bulkhead union, or you won't be able to install it.

Brake lines should be solidly mounted every 200mm using plastic or rubber lined P, press-in or bolt-together clips. Aluminium panels don't count as a solid mount, as they can vibrate, which will promote work hardening and cracking of kuniifer pipes. Obviously, brake lines shouldn't be run under a chassis rail, in case they're torn off when you're not looking. A pressure switch to operate the brake lights may be required, unless you use a pedal activated switch as in most modern production cars. This is usually fitted in to a T-piece in the brake line, but a nifty banjo bolt switch is available that saves making an extra potential leak point in the system.

Calipers: Donor calipers look pretty uninspiring when they're first extracted from the car, but they're free, they fit, they're a suitable specification, pads and discs are probably easy to get hold of and various reconditioning companies can make them beautiful again. OE manufacturer upgrades might be available, for instance the AP four-piston calipers fitted to some



Above: Almost every kit car will use discs at the front and many will use drums at the rear...



Above: ...You need to be careful when stripping and rebuilding drums. Lots of room for error!

special edition MGF Trophys.

Aftermarket calipers can give improvements in braking performance, fade-resistance and unsprung weight. But, unless the installation comes as a complete kit for your specific car (and sometimes not even then) there can be pitfalls.

Larger calipers may require a larger diameter master cylinder to keep the pedal stroke reasonable, which may in turn increase the pedal effort required. To avoid this, a caliper with a total piston area similar to the calipers being replaced should be selected. Total piston area equals piston radius squared multiplied by 3.142 multiplied by the number of pistons in the caliper, although single-piston sliding calipers are treated as having two pistons.

Aftermarket calipers usually have pistons on either side of the brake disc, as apposed to many standard original-equipment 'sliding' calipers, which have one piston mounted on the inside. This means that the aftermarket caliper sticks out further beyond the wheel hub, which can cause problems with wheel clearance, particularly if you use retro steel rims.

Mounting brackets, usually made from simple aluminium blocks, will be required to adapt the calipers to the mounting lugs on your donor uprights. Radial mounted calipers, where the mounting bolts run at 90deg to the more usual lug mount bolts, give a bit more flexibility and make caliper

positioning more straightforward.

Service items, such as pistons and seals, are available for most aftermarket calipers, so they can be rebuilt at home. However, pads are considerably more expensive than mainstream manufacturers' items. Some lightweight aftermarket calipers don't have dust seals on the caliper pistons; so will need inspecting and cleaning regularly. Apparently, this is because dust seals can deteriorate and cause binding in a racing environment, which is fair enough, but possibly not relevant to normal road use.

Rear calipers usually have to include a handbrake system, so once again the donor car parts make a lot of sense. However, lightweight aftermarket calipers that include a handbrake mechanism are available, as are mechanical spot calipers and mounting brackets, which can be used to adapt front-wheel-drive systems that have been moved into a mid-engine location.

Brake discs and pads: Brake discs are usually cast iron, and potentially very heavy. Larger diameter discs can be replaced with much lighter two-piece aftermarket aluminium items. These use a standard replaceable rotor bolted to a central bell that can be adapted to a specific application.

The use of ventilated discs to improve cooling, at least on the front brakes, is almost universal. Drilling and grooving of brake discs, however, remains controversial. Advocates suggest that it keeps the pads clean, reduces build up of gases between the pad and disc, and helps to dissipate water. Cynics retort that it accelerates pad wear for no useful purpose, and is strictly for silly boys in Corsas who are trying to impress bored looking girls in supermarket car parks. The grooves or line of holes are designed to run backwards from the centre of the disc to the edge, although it's surprising how often they don't!

Performance brake pads are widely available and are a worthwhile, cost-effective upgrade. They have a

higher coefficient of friction and greater resistance to fade than standard OE pads, and fast road versions manage to achieve this without compromising performance from cold.

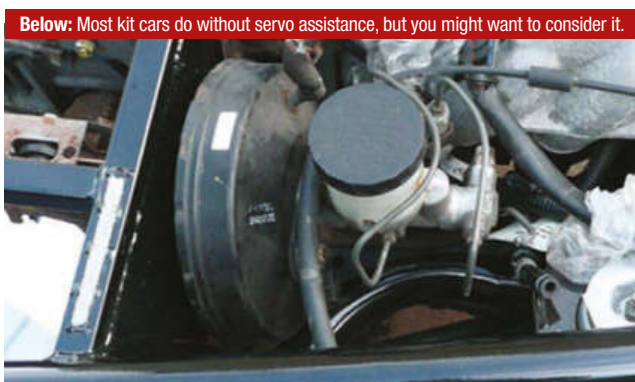
Drum brakes: Drum brakes are a perfectly acceptable choice for back brakes in a moderately powered, lightweight kit car. However, they are more complex than disc systems, with lots of scope for mixing parts up from side to side and assembling something that looks superficially correct, but won't work properly. Lots of photographs taken at disassembly will help, but it's safest to cross-reference with a manual, as the donor car may not be correctly assembled to start with.

Most systems will have a leading and trailing shoe arrangement, with a thicker leading shoe towards the front of the car. The friction material on each shoe is usually applied asymmetrically, with one end of each shoe left uncovered. On the leading shoe the uncovered end is usually next to the wheel cylinder, at the top of the brake backplate, with the trailing shoe the other way up.

Painting the brake drums satin black will improve heat dissipation, but other than assembling them correctly the only other upgrade for rear drum brakes is to swap them for discs and calipers.

Servos: Servos are not widely used in kit cars, even a snorting Ultima GTR manages quite well without one. Adding a servo to a braking system will not increase the system's maximum braking power, only reduce the pedal effort required to achieve it. That said, servos allow the use of wider bore master cylinders that the average driver would struggle to operate without using a very long pedal travel (and maybe some anabolic steroids), which are useful for large 4 and 6-piston calipers. The purist might argue that servos remove a degree of pedal feel.

Most servos rely on a vacuum supply to operate, either from the inlet manifold in a normally aspirated petrol



Below: Most kit cars do without servo assistance, but you might want to consider it.



Above: Brake bleeding is made a lot easier with the right tools.

engine, or via a pump with diesels or turbos. The traditional OE vacuum servo only operates up to moderate braking pressures, anything beyond that is down to the driver.

Donor vehicle servos are quite bulky, and live behind the tandem master cylinder, so they can be a bit awkward to package in a confined kit car pedal box. Single-circuit remote aftermarket servos are available from classic car suppliers, that give a boost ratio of between 2 to 3:1, but are not useful for IVA compatible (or safe...) dual circuit braking systems. However, Car Builder Solutions can supply a remote dual-circuit servo kit, and ABS Power Brakes America produces a system using a new master cylinder that is pressurised by an electric pump and accumulator.

Brake bleeding: Several years ago, after messing about with pumping pedals, Gunsons' Eezibleeds and a vacuum bleeder, which was completely useless, I made a pressure bleeder out of a garden spray bottle and a spare master cylinder cap. The result was a revelation and I was enormously pleased with it. Then I discovered that Sealey sell a similar item, which took the wind out of my sails a little bit, but I'd still recommend that you buy one. They make a potentially frustrating and tiresome job a 20-minute doddle.



Above: Choosing the right brake fluid is important – as is not mixing the wrong ones!

The bleed nipple has to be at the top of the caliper or brake cylinder for bleeding to be effective. This sounds pretty obvious, but occasionally manufacturers (in their wisdom) will mount brake components in non-standard locations, so they have to be removed to be bled correctly. Aftermarket calipers often have four bleed nipples, so they can be mounted either way up. Only the top two need bleeding.

Brake fluid: Brake fluids are either glycol based (DOT 3, 4 and 5.1) or silicone (DOT 5). DOT ratings refer to the boiling point of the fluid – the higher the better, but there are many other differences between the types, which can cause some controversy.

Glycol based fluids are reassuringly familiar, but they have problems. They are hygroscopic, in that they absorb water from the environment, which then diffuses through the system, causes corrosion and lowers the boiling point of the fluid. Opening the fluid reservoir a few times a year can introduce a one percent moisture content to the system that will reduce the fluid's boiling point by 100 deg F. Because of this, fluid manufacturers recommend replacing brake fluid every two years, not that anyone does. Glycol fluid also strips most types of paintwork – so it's worth having some water, some rags and a plan to hand before you start using it, just in case.

Silicone fluid doesn't absorb water, so never needs replacing, and it won't attack paintwork if it's spilled. So why doesn't everyone, including major manufacturers, use it?

Silicone fluid isn't compatible with ABS systems, so it's not much use for new cars, it's much more expensive than glycol, but its main problem is that it gives a 'soft' brake pedal in comparison to glycol based fluids, which gets worse as the fluid

heats up. Some drivers find this very disconcerting, whereas others can live with it in a steadily driven road car. However, most aftermarket brake manufacturers don't recommend silicone fluid for track day use.

DOT 3 and 4 glycol fluids can be mixed, but aren't compatible with DOT 5 (silicone) or DOT 5.1 ('synthetic' glycol). Changing from glycol fluid to silicone is an involved process. Residual glycol will combine with the silicone to form a gel, and residual water won't be absorbed into the brake fluid, but will pool at the lowest point in the brake system causing corrosion and possibly brake failure if the water boils or freezes. The system must be thoroughly flushed through, and ideally all the rubber parts, which can harbour water and glycol, should be replaced. The silicone/glycol decision really should be made before the system is filled for the first time.

Glycol fluid should be bought in small quantities. Once the pot is opened, it will start to absorb water and go off, so storing any that's left over isn't terribly useful. Silicone fluid should be poured down the side of a funnel rather than directly into the reservoir, as it tends to form and trap bubbles very readily, which will worsen an already soft pedal. Leaving it to stand for 24 hours before use will allow any bubbles that have formed during transit jiggling to escape.

ABS: Contrary to popular belief, ABS is permitted by IVA, but if fitted it must work correctly, and have a warning lamp that lights when the system is operational. The system is usually assessed with a driving test, unless the ABS warning lamp lights during the roller speedometer test, which indicates that the system is functioning correctly. ■

Below: Pedals are either floor-mounted or pendulum. Aftermarket pedal boxes available, or you can make one!



Between The Lines

A home for everything
that didn't make it into the
main part of the mag.

Honda's MEV Atomic rival?



It's not that often we can get excited about a Honda (we're even bored by the new NSX given its long gestation), but here's a concept we can get behind. The 2&4 is a single-seater that puts the driver next to the engine. That's a concept you've been able to buy in the kit car scene in the form of the MEV Atomic, of course. Talk from



Honda is of looking for ever more 'immersive driving experiences', which is something else our scene has covered, too.

We're slightly less sold on the 'cabinless' layout, which leaves the seat looking like it's hanging and rather exposed to impact, but we're completely behind the way the 2&4 looks.



2016 Guide... coming soon!

As this issue goes to print, we'll be deep in the midst of producing the annual *UK Kit Car Guide*. As well as being a

useful reference to any would-be or current kit car builder, it's also a great barometer of the industry's offerings. Watch this space to pick up your copy soon!



Squire under Revival radar



The Goodwood Revival's pre-1966 car show always provides a great game of spotting which kit cars and replicas have snuck through the security. The F-plate on this Ford Cortina based Kennedy Squire is a huge giveaway that it's not a 1930s original of the same name.

The Squire Car Manufacturing Company was established in 1935 and lasted just 18 months before it hit the buffers. In that time, it had managed to sell under 10 of its pretty roadsters, which were

remembered by this replica of the 1980s. Rather more of the Cortina based roadsters were built, but even in replica form it's a very unusual sight.

The jigs and moulds were owned by Marlin at one time, but they put the Squire on the back-burner in order to concentrate on their popular home-grown models.

While not strictly being a replica, the AF Sports' raked back grille was probably also inspired by the 1930s Squire.

Inch by winch

Any kit car builder will be familiar with the need to push their part-built cars in and out of the garage – but here's a novel work-around of that effort by Paul Banks, whose Gardner Douglas we feature in this issue.

Rather than continually push his rolling chassis up the slope outside his garage door, he installed a winch inside the garage so that it could be rolled in and out mechanically. Neat trick!



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